Techdebate **CLOUD: READY OR NOT** Some say the service is not quite living up to the hype. **PAGE 19**

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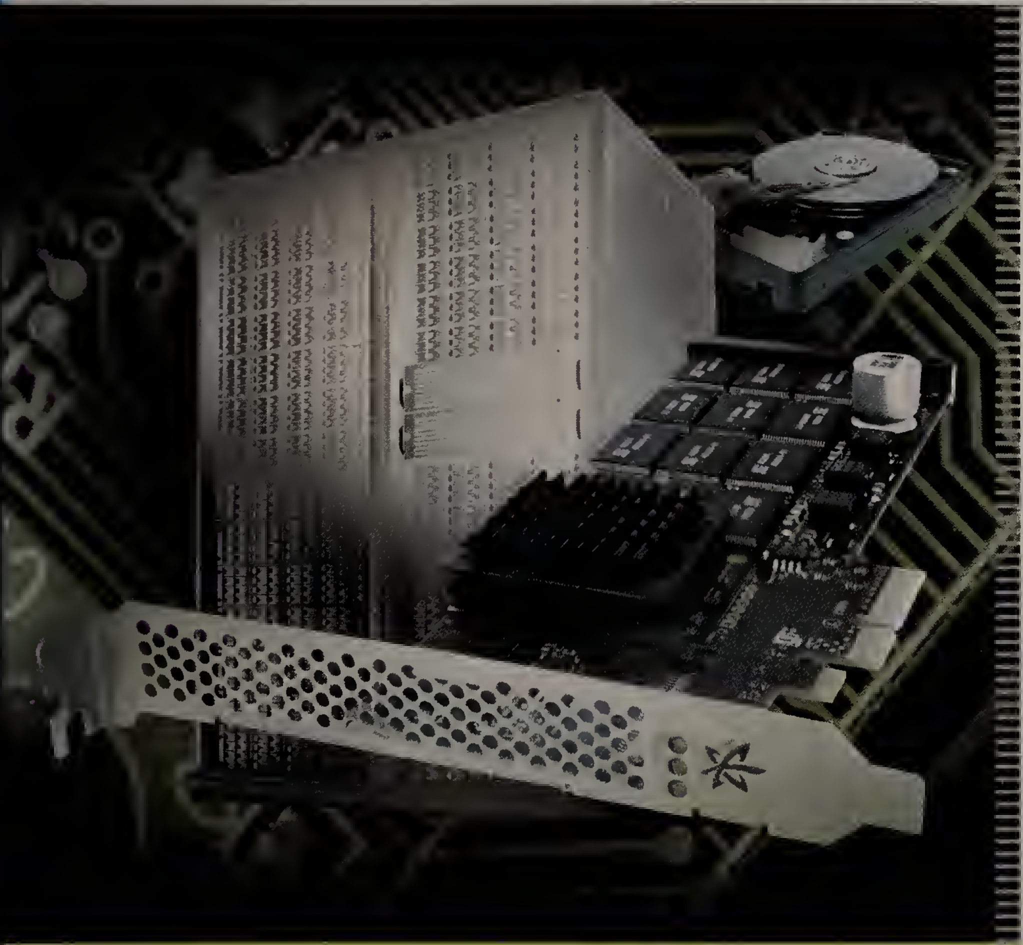

CLEAR CHOICE TEST

SOLID STATE DRIVES

SSDs deliver speed, reliability vs. hard drives

But tests reveal longevity issues and performance woes under sustained 'write' conditions. **Page 22** ▸

Why not iSCSI?

Fibre Channel over Ethernet not for all enterprise IT shops

BY JIM DUFFY

EVEN THOUGH Fibre Channel over Ethernet gets all the hype, iSCSI over Ethernet is just as capable of converging or unifying data center servers, storage and networking, proponents say.

The key component in the unified data center is lossless Ethernet, according to Fibre Channel and iSCSI advocates. Yet there is a war brewing between the two camps on the best way to integrate storage into an Ethernet-based unified data center fabric.

"Everybody thinks that if you go against iSCSI or you go against Fibre Channel, you're a bigot one way or another,"

▶ *See* **iSCSI,** *page 10*

IT certifications worth more now as economy grows

BY DENISE DUBIE

CERTIFICATIONS HAVE always been beneficial to IT job seekers, but lately there's increased emphasis on the importance of certified vendor- and technology-specific training as the economy begins to recover and companies look to plug talent holes in their IT organizations.

"There are great opportunities in technology, but there is increased competition for jobs," says Ray Kelly, CEO of certification provider Certiport. "I have never seen a time like today where there is such a focus on certifications."

In particular, IT pros looking to make themselves more employable are going after certifications that focus on core IT disciplines such as network and security, emerging technologies such as virtualization, and vendor-specific curricula such as Cisco, Microsoft and VMware training.

"In pure volume, the foundation technologies such as routing and switching — without which no network exists — represent a huge amount of our certification portfolio," says Fred Weiller, director of marketing for Learning@Cisco.

▶ *See* **Certification,** *page 12*

Smarter technology for a Smarter Planet:

Why the old ways of working aren't working.

On a smarter planet, technology has made us more connected, but not necessarily more productive. As new global opportunities emerge, companies are finding that their internal processes aren't as dynamic as the marketplace requires. In fact, employees spend up to 25% of their time just looking for information that should be readily available to them. Managers require visibility across their company in order to make fast, informed decisions. IBM can help optimize business processes to align with the way people actually work and provide a contextual, information-rich environment. By combining elements of business process management, collaboration and SOA solutions, employees can act on real-time insights and locate the right people to seize new opportunities—helping to reduce costs.

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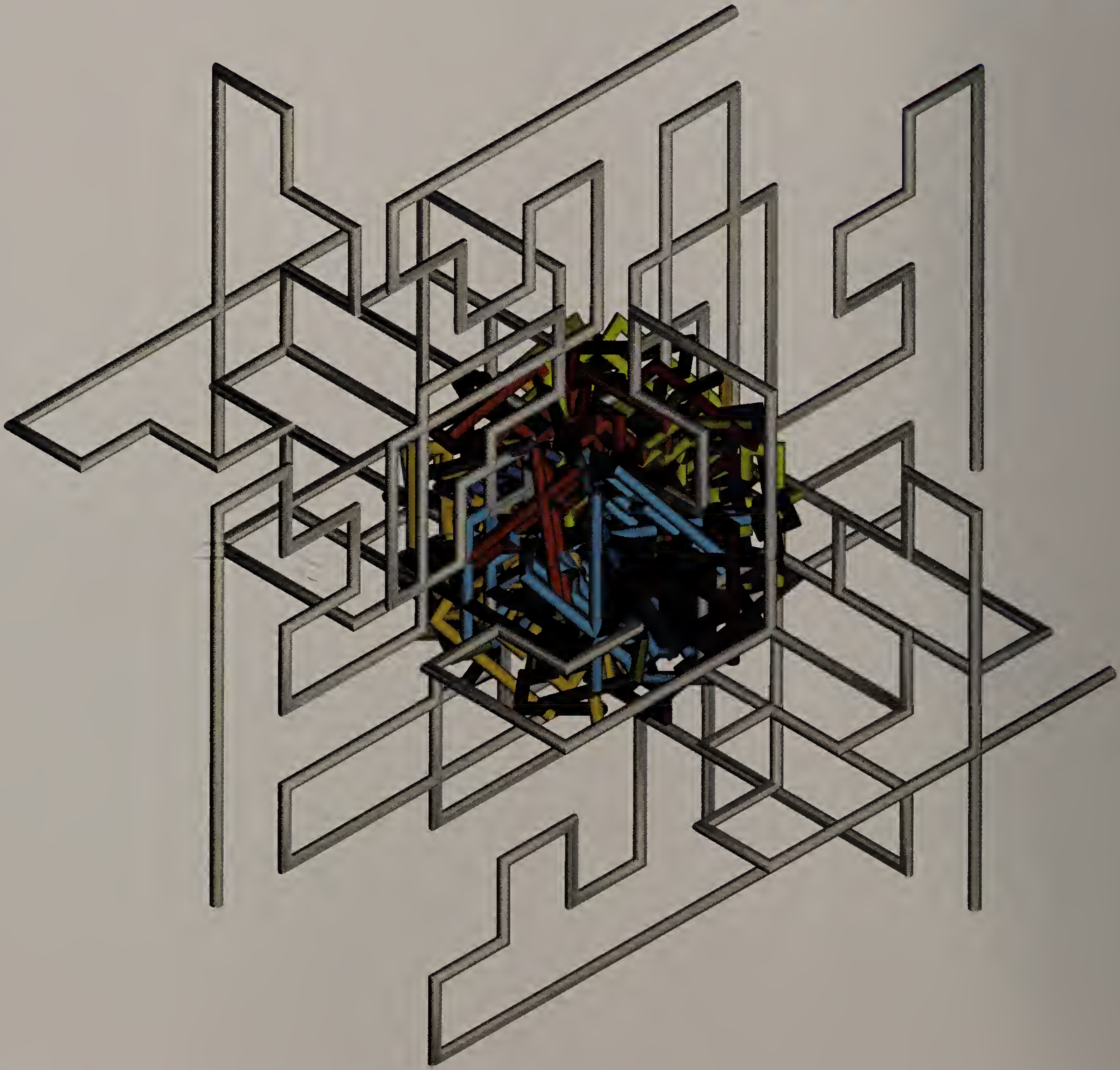

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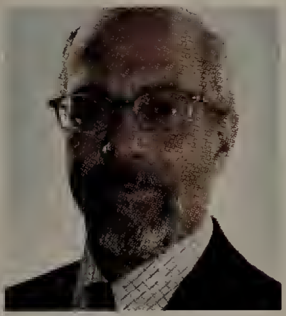
FROM THE EDITOR | JOHN DIX

Don't jump the gun on net neutrality

In the net neutrality debate most enterprise consumers of Internet services seem to favor maintaining the status quo, where traffic on the 'Net is treated in a neutral fashion and service providers don't try to enrich themselves by meddling with the bits. So the question really comes down to the lengths we are willing to go to ensure it stays that way.



After the U.S. Appeals Court in Washington, D.C. slapped the FCC's wrist in the recent Comcast case — saying the Commission overstepped its bounds when it told Comcast not to throttle peer-to-peer traffic — questions emerged about whether the FCC has the authority to implement neutrality and, by extension, its larger broadband plan. Those questions were quickly followed by a raft of suggestions from net neutrality proponents about what should happen next.

Some argue, for example, that Congress should jump in and explicitly give the FCC authority to move forward with these efforts. Even though the Obama administration is a proponent of net neutrality, this seems like a long shot. Past congressional efforts on neutrality have fizzled, and it is doubtful lawmakers in an election year will have the stomach for this.

Others say the FCC should "simply" reclassify broadband services as common carrier services, a type it already regulates. While there are many proponents of this approach, they seem to be glossing over how complex this would be given the foundational nature of the classifications in telecom regulation and the likelihood that such an effort would result in a string of lawsuits. This would be a messy affair that would likely stall any industry progress. And at least two of the five commissioners have said they would oppose such a move.

Still other observers counsel patience. Dr. Alan Pearce, president of Information Age Economics, a former FCC chief economist who also worked with the Obama team on broadband stimulus issues, says the court of appeals ruling is narrowly defined and doesn't mean as much as people are saying. The FCC can find mandate enough in existing doctrine to proceed with the neutrality and broadband expansion plan, he says.

FCC Commissioner Mignon Clyburn seems to agree. She wrote: "We now have the kind of guidance that will enable us to develop the most effective and legally sound rules of the road to preserve Internet openness and to achieve other important goals set forth in the National Broadband Plan."

Yes, net neutrality is important, but count us among those hoping the FCC can find a way to pursue it without having to wait for Congress to wake up and without having to rewrite the rule book.

John A. Dix

jdix@nww.com
Twitter.com/JDNWW

inside

APRIL 19, 2010

8 **Bits** Comments, Blogs and Online

9 **Trend Analysis** Cisco product delays opening doors for rivals. BY JIM DUFFY

14 **Trend Analysis** Why computer science students cheat. BY CAROLYN DUFFY MARSAN

16 **ToolShed Gear Head** Accent Office Password Recovery recovers. BY MARK GIBBS

17 **Cool Tools** Latest Flip is about sharing; Seagate offers movies on hard drives. BY KEITH SHAW

19 **Tech Debate** Cloud: Ready or not? BY JOHN HAGEL III, CHRIS WEITZ AND JAMES STATEN

22 **Clear Choice Test** SSDs offer alternative to hard disks. BY LOGAN G. HARBAUGH

27 **Trend Analysis** Reasons for supporting IPv6 continue to pile up. BY CAROLYN DUFFY MARSAN

28 **Planning Guide** Find out what sessions to attend at Interop.

34 **BackSpin** Fighting piracy with coercion. BY MARK GIBBS

34 **Net Buzz** There's trivia and then there's Apple trivia. BY PAUL MCNAMARA

peersay

Wanted: Wireless coverage for all

I DON'T BELIEVE that the performance woes are due to a higher concentration of traffic because of AT&T's smaller 3G footprint; it's a matter of where people live and dwell that are using the devices. That argument makes it sound as though people congregate in 3G coverage areas just to use their device. (Re: AT&T coverage a concern, not speed; tinyurl.com/y6tmyum)

Major metropolitan areas have high population densities and therefore more network users. So, a lack of sound capacity planning is to blame if you ask me.

I did not ditch AT&T because of 3G coverage since I was in an area where there was an adequate 3G footprint. I left AT&T because the quality of service where it came to maintaining calls was bad.

Anon

THE BASIC ISSUE is that AT&T, Verizon and Sprint only seek to cover areas of high population density. It is time for the FCC to recognize that wireless is a utility and that wireless providers should be required to provide complete coverage for the nation rather than cherry picking population centers.

I travel with extra SIM chips to allow my phone to work on different networks because not only is coverage bad, in some locations roaming is no longer possible. There are developing nations that have better cell coverage than the U.S.

The FCC needs to lay down the law and tell these rascals that if they want to provide coverage using the public airwaves then they will provide coverage everywhere in the country or get out of the business.

Anon

Should Apple support customers or innovation?

I'VE OWNED AND used Apple products since 1984, and abandoning the iPhone first generation is typical Apple poor customer support. (Re: Steve Jobs confirms no more support for original iPhone; tinyurl.com/y8ytrrz)

What a way to reward loyalty — sell an expensive product and then change the playing field and expect people to keep forking over more money when the original product still works. No thanks. I'll keep my first-generation iPhone and the cheaper contract price as long as it is working. Then, maybe I'll jump ship to another smartphone.

anon

IF YOU'RE TOO cheap to upgrade your iPhone then you shouldn't even be an Apple customer. Apple's business model is based on innovation not price. If you want cheap products then stay away from Apple. If you want innovative products then Apple is the way to go. Besides, 2G is so old news. I would like to welcome everyone into the year 2010 by asking people to google 3G and 4. I would however say, if you're using a 2G then you might get your answer sometime next week.

David

Middle ground for net neutrality

NO MATTER ON which "side" of the net neutrality debate one stands, the recourse to an argument based on the likelihood of FCC Chairman Genachowski resorting to another heavy-handed Obama administration mode of governance by executive fiat may be too much to stomach for many readers. (Re: Dead? Hardly. Ruling all but ensures net neutrality; tinyurl.com/y336al3)

Consider the fact that a strict interpretation of "net neutrality" (no arbitration of packet delivery whatsoever) would make a moot point of standards such as QoS that have an obvious impact on services such as VoIP (when message content competes for bandwidth with, say, video on demand). Folks may want to rethink their position on this matter, and adopt something less tyrannical than an all-or-nothing "neutrality".

atursix

CONTACT US

Network World
492 Old Connecticut Path
Framingham, MA 01701-9002
(508) 766-5301
E-mail nwnews@nww.com

Subscriptions (877) 701-2228
URL www.subscribenww.com
E-mail nwjw@omeda.com

Reprints (717) 399-1900

NETWORKWORLD

CEO: Mike Friedenberg
GROUP PUBLISHER: Bob Melk (415) 975-2685
CHIEF CONTENT OFFICER/SVP: John Gallant
EDITOR IN CHIEF: John Dix

News
ONLINE EXECUTIVE EDITOR, NEWS: Bob Brown
ONLINE NEWS EDITOR: Michael Cooney
ONLINE NEWS EDITOR: Paul McNamara
ONLINE ASSOCIATE NEWS EDITOR: Ann Bednarz (612) 926-0470

Net Infrastructure
SENIOR EDITOR: John Cox (978) 834-0554
SENIOR EDITOR: Tim Greene
SENIOR EDITOR: Ellen Messmer (941) 792-1061
MANAGING EDITOR: Jim Duffy (716) 655-0103

Enterprise Computing
SENIOR WRITER: Jon Brodkin

Application Services
NATIONAL CORRESPONDENT: Carolyn Duffy Marsan, (317) 566-0845
SENIOR EDITOR: Denise Dubie

Service Providers
SENIOR WRITER: Brad Reed

Print Layout/Web Production
MANAGING EDITOR: Ryan Francis
COPY CHIEF: Tammy O'Keefe

Design
EXECUTIVE ART DIRECTOR: Mary Lester
ASSOCIATE ART DIRECTOR: Stephen Sauer

Features/New Data Center Supplements
EXECUTIVE FEATURES EDITOR: Neal Weinberg

Clear Choice Tests
EXECUTIVE FEATURES EDITOR: Neal Weinberg
LAB ALLIANCE PARTNERS: Joel Snyder, Opus One; John Bass, Centennial Networking Labs; Barry Nance, independent consultant; Thomas Powell, PINT; Miercom; Thomas Henderson, ExtremeLabs; Travis Berkley, University of Kansas; David Newman, Network Test; James Gaskin, Gaskin Computing Services; Craig Mathias, FarPoint Group
CONTRIBUTING EDITORS: Daniel Briere, Mark Gibbs, James Kobielus, Mark Miller

networkworld.com
EXECUTIVE ONLINE EDITOR: Jeff Caruso, (631) 584-5829
COMMUNITY EDITOR: Julie Bort, (970) 482-6454
PROGRAMMING DIRECTOR: Keith Shaw, (508) 766-5444
EDITORIAL OPERATIONS MANAGER: Cheryl Crivello
OFFICE MANAGER, EDITORIAL: Pat Josefek
MAIN PHONE: (508) 766-5301
E-MAIL: firstinitiallastname@nww.com

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bits

Facts leak on secret counterfeiting treaty

A CONTROVERSIAL PLAN to crack down on online piracy and counterfeiting will be exposed to public scrutiny for the first time this week, when the text of an international copyright treaty will be made public. Treaty negotiations over the past two years have been conducted in secret, but leaks of the draft have emerged. One interesting bit: The treaty could force signatory countries to introduce a so-called graduated response rule that would ban copyright offenders from the Internet after a series of warnings. Countries involved in talks on the Anti-counterfeiting Trade Agreement don't plan to reveal their individual negotiating positions. "In agreeing to release publicly this draft text in the particular circumstances of this negotiation, participants reaffirmed the importance of maintaining the confidentiality of their respective positions in trade negotiations," the European Commission said. ***tinyurl.com/y5r22wa***

If you can't work for 'em, compete with 'em

ROUGHLY TWO months after his departure from ERP giant SAP, former CEO Léo Apotheker has surfaced as a board member of GT Nexus, a maker of on-demand supply chain management software. Apotheker had a short and rocky tenure in the top slot at SAP due to flagging sales and user discontent over an increase in support fees. He was appointed co-CEO in May 2008 and became sole CEO last year after Henning Kagermann's retirement. ***tinyurl.com/y3nyrbd***

Twitter grows up, adopts business plan

TWITTER SAID last week that it actually thinks its business can operate like one. You know, like make money and stuff. Its new business plan is based on, drum roll please ... advertising. Users will start seeing paid messages, labeled "Promoted" at the top of some Twitter.com search results pages. The company will work with Best Buy, Bravo, Red Bull, Sony Pictures, Starbucks and Virgin America to roll out the first ads. Announcing the plan makes the company look less like a grand hobby and more like an actual business, said Rob Enderle, an analyst with the Enderle Group: "Granted, they still will have to demonstrate an ability to make a profit." Twitter also used the occasion to reveal some long-awaited usage figures. It has 105 million registered users and signs up 300,000 new folks every day. A recent estimate from comScore had pegged Twitter's user base at 65 million. ***tinyurl.com/y7urnk3***

IT Video

Virtual display

pCubee shows five LCD display images make it seem like you can see into a box.
tinyurl.com/y2tuhxw

Don't tread on me

DATA CENTER executives from Google, Microsoft, Amazon and other large companies are pushing back against new efficiency requirements proposed by a prominent standards group, saying the specs don't leave enough room to innovate. The proposed requirements from the American Society of Heating, Refrigerating and Air-Conditioning Engineers are "too prescriptive," said Urs Hoelzle, Google senior vice president for operations. Instead of setting targets and letting engineers decide how best to meet them, the proposed amendments to the ASHRAE 90.1 efficiency standard specify types of cooling systems to use. For instance, they call for use of air or water economizers, which use outside air to supplement the cooling done by air conditioners. The concern is that ASHRAE's standard will become part of building construction codes and restrict the ability of data centers to creatively manage energy usage. "I think we're all uniformly in agreement with ASHRAE in the intent of 90.1," said James Hamilton, an engineer with Amazon Web Services. "What's needed to make it a truly influential and high-quality standard is that it be changed to be performance-based rather than prescriptive." ***tinyurl.com/y7d8qcc***

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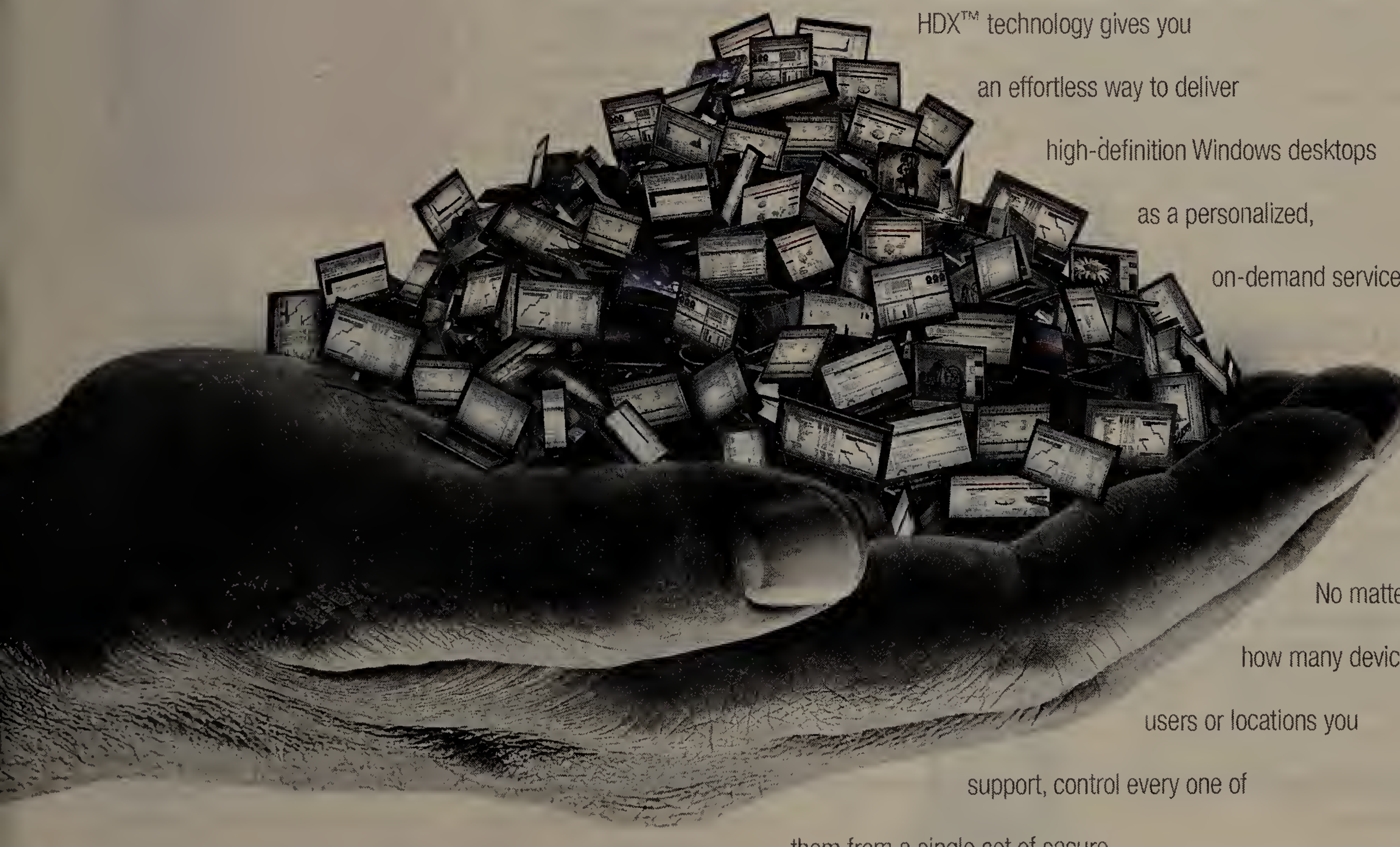

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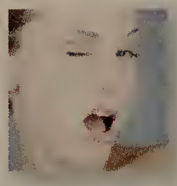
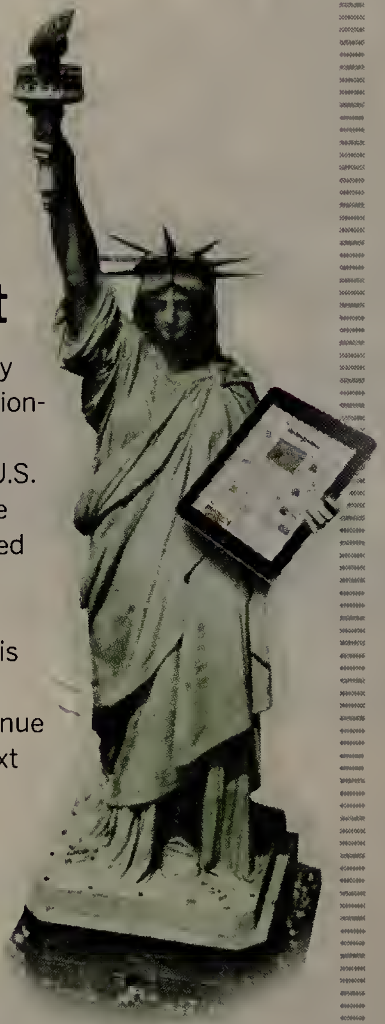
GOOD **BAD** **UGLY**

good

Hey good looking, are you teleflirting with me?



THE REALISTIC audio-visual atmosphere of telepresence combined with off-channel instant messaging is giving rise to a new social phenomenon dubbed teleflirtation. When strangers of the opposite sex are given the chance to meet face-to-face on high-definition telepresence gear and messaging is also an option, they tend to write personal notes to participants at the other sites, says Charles Stucki, vice president and general manager for the TelePresence Solutions Business Unit at Cisco. A main audible conversation goes on among the participants, but some give each other the eye and shift to text-based interaction, he says — teleflirtation.



bad

U.S. hogging iPads, rest of world must wait

APPLE ANNOUNCED it will delay releasing the iPad tablet internationally for a month, in a bid to cope with "far higher" than expected U.S. demand. In a brief statement, the company repeated it had delivered more than 500,000 of the touch tablets in the first week of availability in the United States. That is much more than Apple expected and the demand "will likely continue to exceed our supply over the next several weeks."

ugly

Spam stays on the rise

DESPITE SECURITY researchers' efforts to cut spam down to size, it just keeps growing back. The volume of unsolicited e-mail in the first quarter was around 6% higher than a year earlier, according to Google's e-mail filtering division Postini.

Security researchers have won a few significant battles against the spammers in the last year, first against those hosting the spammers' control systems, and later against the control systems themselves, but they will have to change tactics again if they want to win the war, Google said. These days, spammers typically contract out the business of sending messages to a botnet operator, who controls a group of malware-infected PCs.

The price of full disclosure

SOMETIMES IT pays to keep some of the details about those little security gaffs to yourself. According to new research from Perimeter E-Security, when companies publicly admit they've been breached their stock price drops 12% on average in about 60 days. But when companies don't reveal how many records were compromised, there is no discernible impact on the stock price. Companies appear to have figured out the correlation: In 2009, two-thirds of the public reports of data breach incidents did not state how many records were compromised compared to 42% of incidents in 2008. ***tinyurl.com/y58fnrx***

Fastest doesn't mean best

STUDIES HAVE shown AT&T to have the fastest average download speeds of any other 3G network in the United States, yet complaints about its data service keep rolling in. Of course AT&T blames it all on the iPhone, arguing that the data demands from users of the slick little bricks are unprecedented. But a new study from ABI Research suggests this claim doesn't hold up. Sprint and Verizon each carried at least 16 billion more megabytes of mobile network data — mainly from laptops —than AT&T did in 2009, ABI said. A more probable reason for the customer complaints: the size of AT&T's 3G network, which is vastly smaller than the footprints of competitors. This means iPhone users can experience significant service drop-offs when they travel to areas that only have 2G coverage, ABI said. It also means AT&T has to contend with a large concentration of users consuming very large quantities of data in a relatively small area, degrading the overall experience. ***tinyurl.com/y66w6df***

TRUE FACT

30x

That's how much data Internet-connected smartphones generate compared with the cell phones they replaced.

FCC CHAIRMAN JULIUS GENACHOWSKI AT THE NAB SHOW, LAS VEGAS

Lowly hardware's moment in the sun

YEA, THE glory is all in the software, but hardware is making its own steady gains. According to Forrester Research, computer equipment spending will increase 11% to roughly $83 billion this year, as corporate buyers plunk down the green for mobile PCs, desktops, servers, storage and network devices. That will contribute to total U.S. spending on IT products and services of $741 billion. Separately, Gartner forecasts worldwide IT spending to reach $3.4 trillion in 2010, up 5.3% from 2009. "Computing hardware suffered the steepest spending decline of the four major IT spending category segments in 2009. However, it is now forecast to enjoy the strongest rebound in 2010," said George Shiffler, research director at Gartner. ***tinyurl.com/y2xxlrs***

Cisco product delays opening doors for rivals

Component shortages leading to delayed Cisco shipments of Ethernet switches

BY JIM DUFFY

CONTINUING PRODUCT supply constraints at Cisco has some customers waiting months for key Ethernet switches, firewalls and other network gear — and those who can't wait are turning to competitors.

According to posts on the Cisco network service provider (Cisco-nsp) mailing list, customers have to wait at least a month for switches like the Catalyst 6500 and 4900s, and also are facing delays for ASA firewalls, Nexus switches, Catalyst 3560 switches and other products and accessories. Some customers report delivery lags by as much as four to six months.

The product delay problems have been a topic of discussion among financial analysts and others for months. In some cases, customers are now opting for products from competitors because they can't wait for Cisco to deliver.

"We've actually cancelled orders with Cisco for [multiple Catalyst] 4948s (90 day lead time) and replaced them with another vendors switch (<2 week lead time)," posted one network/software engineer customer on the site.

Some product delays are due to changes in the hardware of the products. Shipments of Cisco's ASA firewall are delayed until late June because of a chipset change on all ASA products, another customer posted.

Customers report that shipments of Cisco's ASA firewall are delayed until late June because of a chipset change on all ASA products.

This situation led to competitor Sonicwall winning some firewall business that would have gone to Cisco, another posted. Others are opting for used gear from suppliers offering overnight shipping.

Network Hardware Resale, for example, advertises immediate delivery of supply-constrained Cisco products, with one-year warranties and support from Cisco-certified technicians.

Cisco is aware of the problem, which it apparently views as a good one to have.

"As we mentioned during our last quarterly conference call, we have experienced longer lead times on several of our products," a company spokesperson wrote in an e-mail reply to *Network World*. "This was the result of increased demand driven by the improvement in our overall markets. And, similar to what is happening in the entire industry we are seeing some product lead time extensions stemming from supplier constraints. We continue to build upon our strong relationships with our suppliers to proactively manage our supply chain and minimize any potential impact to our customers and partners."

But some analysts say the situation could backfire on Cisco.

"While an unexpected surge in demand that creates supply could be seen as a good thing, I think Cisco hasn't yet realized how the market dynamics are shifting," says Mark Fabbi, vice president and distinguished analyst for Enterprise Communications at Gartner.

"In the past their customers would be unhappy — but they would wait. Today, it is increasingly common for them to say fine — if Cisco can't supply Juniper or HP will. I've dealt with a number of clients that have come to this conclusion due to supply chain delays. Cisco is no longer the only game in town and not managing their lead times more appropriately will just drive business to their competitors," he says. ■

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▸ **iSCSI,** *from page 1*

says Craig Chapman, director of Cisco Unified Computing System strategy at systems integrator MCPc in Cleveland, Ohio. "You can't be a protocol passionista. You can't be tied to one way of doing things. It's, 'What's best for the solution based on what you've seen? And you've got to balance those out."

Chapman says iSCSI does not compete with FCoE as a method for unifying a data center fabric. Both have their place, especially if an enterprise has an installed base of one or the other.

Fibre Channel is usually preferred by larger enterprises with a low tolerance for latency and packet loss, and a requirement for high application throughput. But it requires its own infrastructure, which drives up its cost.

Smaller and midsize enterprises might opt for the less expensive iSCSI, which is more latency tolerant than Fibre Channel and "lossy," Chapman says.

"You will see iSCSI in enterprises, especially for replication solutions and for remote office installations," says Steven Scully, research manager at IDC. "At the core, those customers will be the big FCoE users. On the other hand, you probably won't find much FCoE in SMB customers."

Since it runs over TCP/IP, iSCSI is susceptible to TCP "overhead," such as the windowing characteristic in TCP, Chapman says. A TCP window is a chunk of data, made up of several packets, sent by a server. After the server receives an acknowledgment from the client that the window has been received —without errors — it will send the next window of packets.

If errors occur, the data must be resent. This can introduce latency and packet loss with iSCSI, Chapman says. But nothing precludes a business from converging or unifying servers, storage and networking in a data center with iSCSI — Cisco says its can transport iSCSI over Ethernet just as capably as FCoE.

And 10Gbps iSCSI converged network adapters are appearing on the market from network interface card vendors such as Emulex.

Yet FCoE garners most of the hype and press coverage because of Cisco's emphatic endorsement of the technology for unifying data centers — and because it's newer than iSCSI. FCoE was standardized less than a year ago while iSCSI is at least 10 years old.

Cisco acquired its way into iSCSI with the 2000 purchase of NuSpeed, an iSCSI router start-up. Cisco has since killed off the NuSpeed product, which was called the SN 5420.

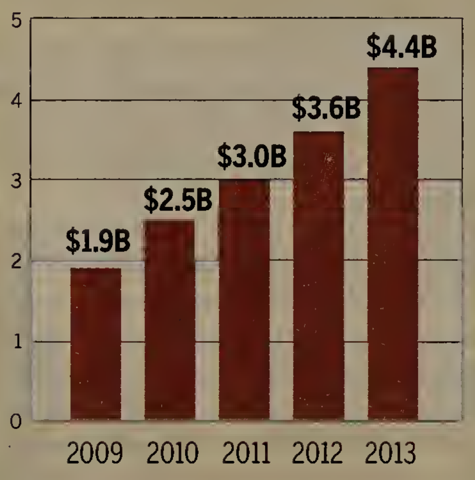
"ISCSI we saw — and it played out this way — as more of a small-business play, where there was such a large entrenched base of Fibre Channel that was projected by the analysts to continue to grow," says Jackie Ross, vice president of marketing in Cisco's Server Access and Virtualization Group. "We couldn't ignore that."

And iSCSI is even losing ground to network-attached storage (NAS) in the SMB market because SMBs are now opting for file-based storage — which NAS supports — vs. block-based storage, which iSCSI and Fibre Channel support, Ross says.

"For SMBs, NAS — or file-based storage — has grown up as their needs have grown up," Ross says. "With some of the needs you could only get in block-based storage — disaster recovery, much better management of multiple networks — you can now get with file-based storage. That's the reason NAS has grown at double the rate of iSCSI."

Worldwide spending on iSCSI

IN THE BILLIONS



SOURCE: "WORLDWIDE ENTERPRISE STORAGE SYSTEMS 2009-1013 FORECAST UPDATE", IDC, DECEMBER 2009

But there's still healthy growth in iSCSI. It's growing at about 25% per year for companies that have not opted for NAS over direct-attached storage, Ross says.

According to Dell, the market leader in iSCSI SANs, it's even healthier than that. IDC reports that the iSCSI SAN market grew 40.6% year over year in the fourth quarter of 2009. Dell, with its EqualLogic iSCSI line, led that market with 29.2% revenue share, followed by HP with 18.5%.

For the full year 2009, spending on iSCSI storage gear was $1.9 billion, according to IDC, and is expected to grow to $4.4 billion in 2013 — a compounded annual rate of 23.4%. Users spent $9.2 billion on Fibre Channel/FCoE/InifiniBand gear in 2009, and that will grow to $11.1 billion by 2013 — a CAGR of less than 5%, according to IDC.

Meanwhile, Dell says it recently commissioned Forrester Research to conduct a survey of the storage and unified fabric plans of 213 companies. According to Dell, the survey found that two-thirds of respondents are moving toward a unified fabric in one to three years; and of those with awareness or knowledge of unified fabric, 56% believe iSCSI is best suited while 27% believe FCoE is best suited.

Regarding storage purchases in the next 12 months, 10 Gigabit Ethernet and iSCSI arrays are the top two selections, Dell found in its survey. Among all survey respondents, 45% planned to purchase 10G Ethernet switching or related components, while 39% planned to purchase iSCSI arrays.

Dell is encouraged by these findings and its position in the iSCSI market as customers consider converged data center fabrics.

"If you're looking to make a unified fabric decision today, you're looking at iSCSI, which has been around for . . . years now," says Travis Vigil, senior manager, Dell, who is responsible for the EqualLogic iSCSI storage portfolio. "There's years of testing and validation, real-world customer deployments behind it, and it allows you to unify your fabric at 1Gbps and 10Gbps. So it gives you more flexibility than what you may be able to realize with other technologies."

Both Vigil and Ross agree, though, that the real unifier in the converged data center is a lossless version of Ethernet with flow control capabilities, which is being standardized now in the IEEE's Data Center Bridging (DCB) task group.

"We violently agree on the 'over Ethernet' part," Vigil says. "Whether customers deploy iSCSI over that or FCoE is the next choice."

And the DCB enhancements to Ethernet will benefit iSCSI just as much as FCoE in making the converged fabric lossless, low latency and more reliable, Vigil says.

"The difference is, [the DCB enhancements] are required for FCoE whereas for iSCSI you have flexibility in that they're not required — but they do help in terms of providing more predictable performance in converged infrastructures," he says.

"We always find it a little challenging when people say it's one or the other — no it isn't," Ross says. "It's making sure that you have the right fabric in place that's going to be able to support any choice that you want."

So can iSCSI be used to converge your storage facilities with your servers and network as long as you have a lossless Ethernet fabric?

"I certainly think so," says Frank Berry, CEO and senior analyst for the Unified Networking Practice at IT Brand Pulse, a data center market analysis firm. "It depends on who the audience is."

Berry expects revenue from iSCSI storage to exceed revenue from Fibre Channel storage within five years. ■

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▶ **Certification,** *from page 1*

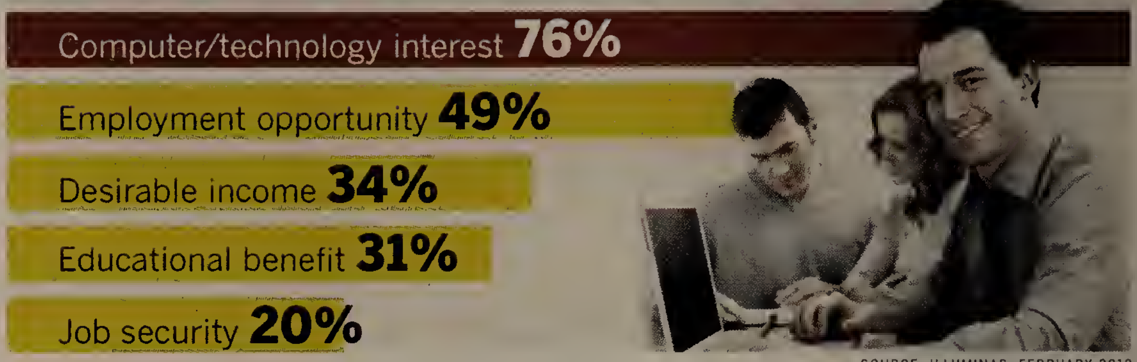
These days, Cisco Certified Internetwork Experts see virtualization as the top networking investment area (cited by 67% of 970 CCIEs polled by Illuminas on behalf of Cisco). Another 64% say security and risk management will continue to be the networking skills in greatest demand.

Already, "professionals with 'cyber' on their resume can command a 20% salary premium as both the public and private sectors are becoming more aggressive in building their security talent pipeline," notes Thomas Silver, senior vice president at Dice. The high-tech job board listed more than 62,000 tech jobs available as of early April, about half of which are contract or part-time positions.

Determining the best IT certification to pursue depends on an individual's existing skill level, career goals and accessibility to training. Here are five of the hottest IT certifications.

For love or money?

A passion for technology, along with career opportunities, topped the reasons most Cisco Certified Internetwork Experts chose a career in networking, according to a recent survey of 970 CCIEs.



SOURCE: ILLUMINAS, FEBRUARY 2010

1. VMware Certified Professional

The VMware Certified Professional (VCP) program, now available on vSphere 4 (VCP4), seems like a no-brainer. With virtualization technology growing within the majority of organizations, it is critical that the talent pool keep up with the technology. Yet recent research shows that enterprises are worried about a lack of expertise specific to virtualization. New skills need to be acquired for virtual systems, and new management and automation technologies must be introduced into the environment. According to Forrester Consulting, which interviewed 257 IT professionals on behalf of CA, "the proper skills for the future are difficult to attain and retain."

2. Microsoft Certified Technology Specialist

Microsoft continues to dominate most desktops in U.S. business. Its Windows operating system boasts more than 91% market share, according to March figures from Net Market Share, and Microsoft has seen accelerated interest in the latest revision, Windows 7.

"Microsoft continues to leave its computing fingerprints on most desktops," says Sheri McLeish, a Forrester Research analyst.

IT professionals who become a Microsoft Certified Technology Specialist (MCTS) can prove their abilities around implementing, building, troubleshooting and debugging specific Microsoft technologies.

"In terms of training and certification, we have seen the fastest ramp up on Windows 7 than any technology in the past five years," says Chris Pirie, general manager of sales and marketing for Microsoft Learning. "We are anticipating a big wave of desktop refreshes and we will be having a new wave of Office software this summer. Certification is very hot for us right now."

3. Cisco Certified Architect

IT professionals with a few certifications under their belts could consider upgrading to what has been dubbed the Ph.D. in Cisco.

The network giant last year added to its educational roster with a new level of certification, the Cisco Certified Architect (CCA). While Cisco boasts more than 20,000 CCIEs worldwide, the vendor decided to build another layer of expertise on top of its proven certification program. The CCA requires applicants to be certified as Cisco Certified Design Experts (CCDE) and have 10 years of experience.

"One of the key things we are testing or investigating is the ability for a candidate to understand the business side and translate that into technology demands," Cisco's Weiller says. "The CCA builds upon the CCDE program, which in itself is very much in demand. Networks have become very sophisticated and to be able to design and build a network that can adapt to changing needs and stand the test of time is critically important in making an individual successful in a networking career."

4. CompTIA Strata Green IT

While vendor-specific knowledge and foundational certifications seem a prerequisite for most jobs, IT professionals in 2010 should also consider amping up their vendor-neutral skills around technologies that continue to gain attention from high-tech as well as business leaders.

"From CompTIA's perspective, entry-level certifications such as the A+ and Network+ are going through the roof, and we are seeing double-digit growth in Security+ certifications," says Terry Erdle, senior vice president of skills certification at CompTIA (Computer Technology Industry Association).

Building on the basics, CompTIA just announced a new training track, green IT. CompTIA's Strata Green IT certificate is recommended for IT professionals with 18 months of technical experience and IT credentials such as CompTIA A+ or Server+, and the program is designed to show that a candidate is schooled in power management as well as virtualization techniques. The certification also includes training on developing and calculating ROI for green IT initiatives and knowledge of environmentally sound waste disposal techniques.

5. ITIL v3 Foundations

For many, the goal this year is to streamline IT operations, adding automation where possible, while at the same time increasing services to users. The premise of overhauling the way IT works is outlined in the IT Infrastructure Library, or ITIL (Version 3 is being adopted).

With four levels of ITIL certification, IT professionals can prove they understand the principles around service life-cycle management. Companies seeking such expertise would likely desire a candidate who couples ITIL skills with security or other technical expertise. Considered more of a process-oriented area, ITIL can still deliver benefits such as improved availability, faster problem resolution and reduced costs due to streamlined processes.

"Whether you want to call them soft skills or business skills, IT professionals need communications skills, they need to be able to manage a project, and they need ITIL skills to show they understand the service life cycle," Weiller says. "Individuals need all these ■

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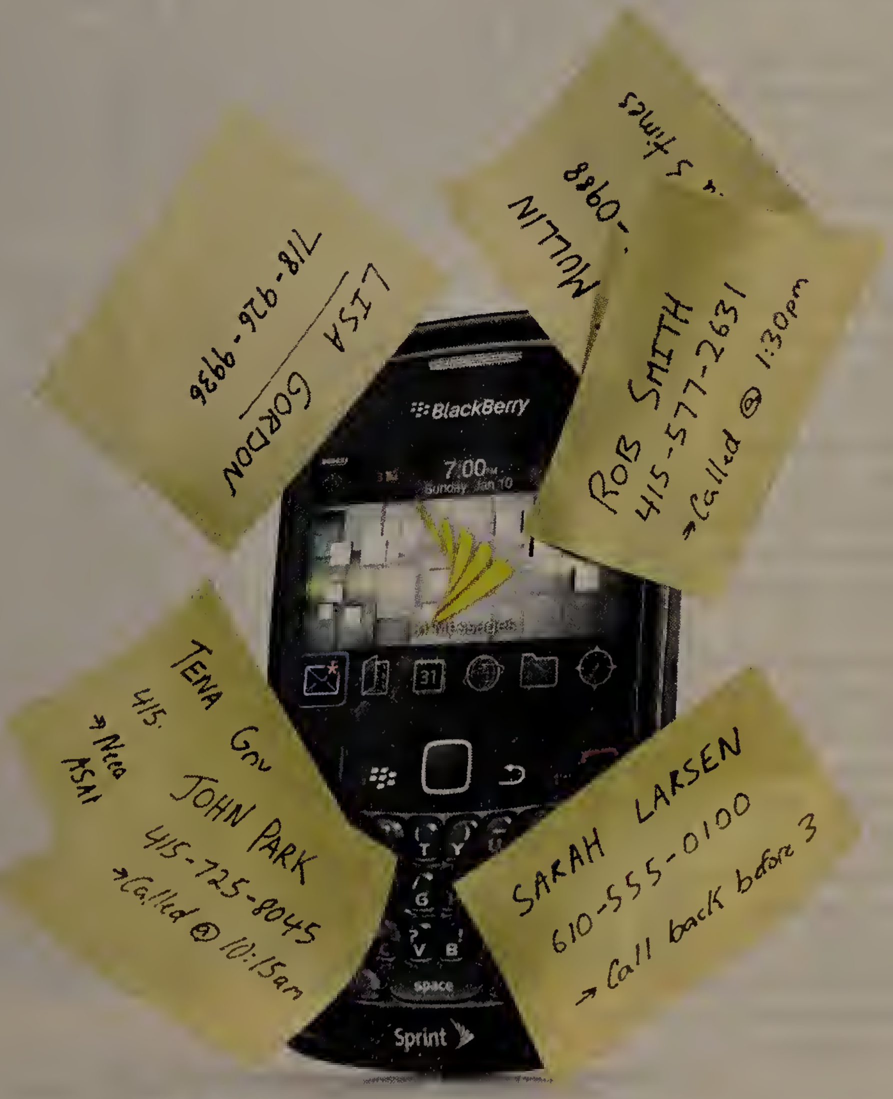

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FOCUS on driving

Why computer science students cheat

Pressure to achieve running code leads more students to collude on assignments

BY CAROLYN DUFFY MARSAN

ENROLLMENT IN undergraduate computer science courses is at an all-time high at colleges nationwide. But this trend that's been hailed by the U.S. tech industry has a dark side: a disproportionate number of students taking these courses are caught cheating.

More students are caught cheating in introductory computer science courses than in any other course on campus, thanks to automated tools that professors use to detect unauthorized code reuse, excessive collaboration and other forbidden ways of completing homework assignments.

Computer science professors say their students are not more dishonest than students in other fields; they're just more likely to get caught because software is available to check for plagiarism.

Half the academic dishonesty cases at the University of Washington involve computer science students.

"The truth is that on every campus, a large proportion of the reported cases of academic dishonesty come from introductory computer science courses, and the reason is totally obvious: we use automated tools to detect plagiarism," explains Professor Ed Lazowska, chair of computer science and engineering at the University of Washington. "We compare against other student submissions, and we compare against previous student submissions and against code that may be on the Web. These tools flag suspicious cases, which are then manually examined."

Stanford University disclosed in February that 23% of its honor code violations involved computer science students, although these students represent only 6.5% of the student body. Of 123 honor code violations investigated last year by Stanford's Judicial Panel, 28 involved computer science students.

"The tools that we employ make it easy to catch students cheating," says Professor Mehran Sahami, associate professor of computer science at Stanford. "I wouldn't say that computer science students violate the honor code more often or are any more dishonest."

FRANK STOCKTON

> **"THE TOOLS THAT WE EMPLOY MAKE IT EASY TO CATCH STUDENTS CHEATING."**
>
> **PROF. MEHRAN SAHAMI,** ASSOCIATE PROFESSOR OF COMPUTER SCIENCE AT STANFORD UNIVERSITY.

Online: CS schools
Watch a slideshow of the 10 hottest computer science schools.
tinyurl.com/yc7wpmz

Sahami says computer science students mistakenly believe that writing software code is similar to solving a mathematical proof, where one correct answer exists. What students don't realize is that software code is more akin to writing an essay and that a significant amount of creativity is involved.

"One of the things that happens in computer science and contributes to the cheating rates is that students are unaware of how dissimilar programs that do the same task really look," Sahami says. "They tend to think that it's OK if they copy portions of someone else's program. But our tools can discover this."

Behind the cheating epidemic

As more college students study computer science, the number of cheating incidents is on the rise.

At the University of Washington, total enrollment in the two introductory computer science courses is the highest ever, approaching 2,750 students over the last four quarters compared with 2,500 students a year ago. In these two courses, between 1% and 2% of the assignments are identified as involving academic dishonesty, Lazowska says.

The top computer science schools in the country are experiencing the same trend.

"We see more cheating. It's something we're working hard to stop through a number of means," says Professor Lenny Pitt, director of undergraduate programs at the Department of Computer Science at the University of Illinois. "Cheating has gone up across many fields because it's easier to find with the tools we have today."

Cheating in introductory computer science classes typically involves homework assignments rather than exams. Students get frustrated when their code won't run, and that's when they are tempted to borrow solutions from someone else.

Because computer science assignments are complicated and need debugging, professors assign the same homework several years in a row. That means students can find code written by someone who has already taken the course.

"There's a lot of infrastructure that needs to be built and a lot of effort that goes into creating a homework problem. There's a disincentive for professors to change those problems every semester. So we tend to reassign similar problems, and that causes cheating because past solutions are available," Pitt says, adding that the University of Illinois checks homework against a repository of past solutions.

The other common form of cheating involves excessive collaboration.

"Many of our students like to collaborate, but at what point are you copying?" Pitt asks. "The course policy needs to be really clear. Some courses will allow you to work in pairs but not in triples. If you don't follow that policy, we would call that cheating."

At Stanford, students are allowed to discuss strategies for solving homework problems, but they need to write their own code. "You shouldn't be looking at someone else's program, and you shouldn't be sharing yours with other computer science students," Sahami says.

Sahami says the introductory computer science courses require students to code their own programs, while higher-level courses allow for more teamwork. "We want them to learn the mechanics first, and then open up the world of collaboration," he adds.

Students often resort to cheating because they feel excessive pressure from their peers and their families to excel, professors say.

"Anecdotally, we see a larger incidence of cheating among foreign students then domestic students, and I think part of that is that they are under extreme pressure to do well and succeed,” Pitt says. “That pressure contributes to the idea that they need to do as well as possible even if it means taking some shortcuts.”

Computer science professors say just as much copying and excess collaboration goes on in other college courses.

“Does anyone in their right mind think that [cheating] isn't happening in large introductory courses in other fields? If so, they're smoking something,” Lazowska says. “There have been several cases in which faculty in other disciplines have adapted these tools to detect plagiarism in term papers, and have found plagiarism rates far greater than typically encountered in computer science courses.”

Why industry should care

As college recruiters traipse across the country seeking the best computer science graduates from the Class of 2010, they need to be aware of the rising incidents of cheating in computer science courses.

“Ethics is a huge issue in the IT industry, not just with copyrights and licensing but with privacy,” says David Foote, CEO of Foote Partners, a research firm tracking IT workforce management and compensation issues. Foote sits on the advisory council for Hiram College's Center for the Study of Ethics and Values. “We need to be looking at the idea of how do we breed people to be concerned naturally about issues of ethics and morality.”

For CIOs and other hiring executives, the issue is whether copying code for homework assignments could lead prospective employees to ethical lapses on the job. Businesses want to hire entry-level workers who won't get in trouble for software licensing, patent infringement and other intellectual property problems.

“There are not enough programs in American universities that are looking at ethics and cheating,” Foote says. “Don't pick on computer science people. Pick on the fact that universities are not doing enough in general about calling attention to cheating.”

Foote points out that some incidents of excess collaboration that qualify as cheating on college campuses would be encouraged by industry, which wants employees to reuse software to improve efficiency and cut costs.

“In the real world, people write code in teams where they are given pieces of a project to work on,” Foote says. “The academic world should be mapping onto the real world...They shouldn't be handing out assignments where people are coding on their own.”

To encourage collaboration, Georgia Tech changed its approach to cheating in its introductory computer science courses in 2007. Instead of trying to catch and punish students for excessive collaboration, Georgia Tech requires students to disclose the names of the other students that helped them complete their homework.

“Students sign a collaboration agreement,” explains Cedric Stallworth, assistant dean for undergraduate enrollment at Georgia Tech's College of Computing.

“We realize that computing is one of the subjects that is best learned in a group. If students are using somebody else's code and are learning from it, that's all right,” he adds.

To ensure that the students are mastering the material, Georgia Tech requires them to give an oral demonstration of how their software works for one of their teaching assistants.

“We worry less about catching cheaters. We worry more about properly assessing the student's skill set,” Stallworth says. “Less percentage of the grade is from homework and more percentage is from the assessment, and the assessment is designed to truly [measure] skills. Then you can cheat on homework, but that's not going to help you with the assessment that counts for the bulk of your grade.”

No rise in failure rates

Computer science professors do not think that cheating is a result of students being unprepared to take introductory-level courses. They are not seeing a rise in failure rates or a drop in grades. Instead, they say their students are more qualified than ever.

“We haven't seen an increase in failure rates,” Stanford's Sahami says, adding that 5% or less of students typically fail introductory computer classes. “This is not a student body that accepts failure. For them to pass all of their classes is an important thing.”

Lazowska says rising enrollment in computer science courses is a more important trend than the resulting increase in plagiarism cases.

“An ever-broader range of students is recognizing that, even if they major in something else, college-level preparation in computational thinking is essential,” Lazowska says. “There is no reason to believe that computer science students are anything other than better than ever.” ■

[TOUGH QUESTION #9]

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TOOLS

Accent Office Password Recovery recovers

Mark Gibbs' Gearhead

Have you ever had a Microsoft Office document that was locked and you really needed to unlock it? A friend had this problem a while ago and I might have been able to help had I known about Accent Office Password Recovery (AOPR) published by Accentsoft.

The software mounts one of three types of attacks to "crack" the protection. These attacks are brute force, mask-based and dictionary-based attacks. A dictionary-based attack tests possible passwords based on a list of possible passwords, and can be very successful when a naïve (or lazy) user has chosen a predictable password.

With AOPR you can use any number of dictionaries and a large number of specialized dictionaries can be downloaded. You can also create your own dictionary; these are just plain text files with one word per line.

AOPR can be configured to try each word along with any or all of the following options: working through all combinations of lower and upper case, interchanging adjacent characters, skipping characters, and appending numeric characters to the word.

Your next choice is a brute force attack. This involves testing all possible passwords and it's sometimes the only way to recover a password. That said, while this could be considered the most reliable method, it is also the slowest with the actual maximum time required being directly dependent on the computing power of your system and the length of the password you're trying to break.

A mask-based attack combines the power of a brute force attack with a directed search by testing only passwords that meet a specific pattern or mask. This assumes you have some idea what the maximum and or minimum length of the password might be.

> The software mounts three types of attacks to **"crack" the protection**.

For the brute force and mask-based attacks, Accentsoft uses a clever trick: When AOPR finds one or more compatible graphics cards, it can run its cracking algorithms on the Graphics Processor Unit (GPU). Currently, AOPR supports ATI graphics cards with Stream/OpenCL technology (the 4XXX and 5XXX families) and Nvidia graphics cards with CUDA technology (eighth generation GeForce graphics cards and later) which, the company claims, can produce passes (cracking attempts) at a rate 60 times faster than a regular CPU.

I first tested AOPR using a mask-based attack on a password protected Word 2000 document. My password was five characters long so I created a five character mask and allowed for upper- and lowercase as well as numerics, spaces and symbols, which gave AOPR 7,417,954,634 possible passwords to check. On a Dell XPS 420 (2.39GHz Core2 Quad CPU with 4GB of RAM and an Nvidia GeForce 8800 GT video card) running Windows Vista Ultimate SP2, the estimated maximum solution time with AOPR running at normal priority was around 22 minutes. The reported password testing rate was 4,560,000 tests per second and a solution was found in about 12 minutes.

I also set up a dictionary attack using a dictionary of 3,163,420 words with all of the dictionary attack options enabled except for

▶ *See* **Gearhead,** *page 17*

IT asked and answered

Ron Nutter and **Steve Blass** tackle your tough tech questions at **tinyurl.com/yg2o434**

What's best for SSL Certificates, Safe Exim, MCA-21, individual Certificates or Verisign? —Sanseo

➔ When looking at a Certificate Authority (CA) provider, the first thing to consider is the platform the CA will run on. Depending on the combination of the CA and the application, this can significantly reduce the number of options. For example, I helped a company get their application Web servers SSL capable and, at the time, the applications they were using were only supported by one CA. While they could have gone the self signed certificate route, that presents its own set of challenges because they would then have to deal with the workstations that would be accessing the server and enabling them to trust the self signed cert. Something else you will need to think about is the level of certificate you'll use. The certificate should match the level of trust the certificate presents to the user/customer using it. The higher the level of trust, the more prep work you will need to do in order to get the cert issued. If you haven't dealt with certificates before, a suggestion: When you generate the certificate request file you send to the CA to get the certificate, make a backup of that file. The same goes for the certificate file you get back from the CA. If you ever need to rebuild the server from scratch, having both files will make it a little easier to get the cert back in place. Ultimately you might still have to request an entirely new certificate, but this gives you an opportunity to avoid that step.

GADGETS

Latest Flip is about sharing; Seagate offers movies on hard drives

Keith Shaw's Cool Tools

THE SCOOP

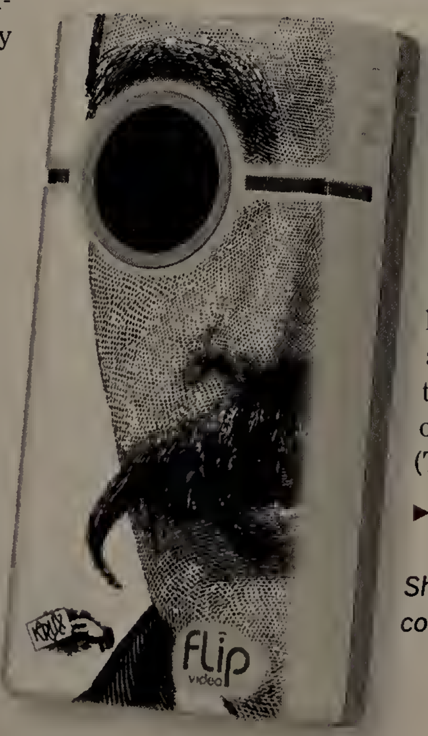
FlipSlideHD video camera

by Cisco, about $280.

▶ **What it is:** The newest digital video camcorder from Cisco, the FlipSlideHD adds additional recording time (up to four hours) and a new form factor that lets users slide the screen to produce an angled viewing display for showing videos. The 3-inch widescreen also includes a touch-screen capability for recording and zooming (no physical buttons for record/zoom).

▶ **Why it's cool:** The larger screen on the FlipSlideHD lets you show videos that you've recorded more easily than with previous versions, and without having to rely on connecting to a computer or attaching the device to a TV. You can still do that if you want, but the larger screen lets you show the videos to others more comfortably. The camera can produce high-definition videos at 1280 by 720 resolution at 30 frames per second, and the internal rechargeable battery offers up to two hours of life. The additional storage capacity (16GB) lets you store more videos on the drive, and you can take previously shot videos and put them back onto the Flip.

Cisco's FlipSlideHD provides additional storage capacity.



▶ **Some caveats:** It took some time to get used to using the "virtual" buttons for recording and zooming on the display, rather than the physical buttons on the earlier versions. I'm still annoyed that there's no external microphone jack, which bothers those of us who use these cameras for "professional" purposes.

▶ **Grade:** ★ ★ ★ ★ (out of five).

THE SCOOP

FreeAgent Go hard drives

by Seagate, about $100 for 500GB model.

▶ **What it is:** Seagate is bundling preloaded Paramount movies on select models of its FreeAgent Go external portable hard drives. The drives come with 21 movies, and let users purchase codes to unlock the movies for viewing on a Windows PC or notebook (the code authorizes three systems). Users can also buy a separate FreeAgent Theater+ HD Media Player ($130), attach the drive and then watch movies on any TV.

▶ **Why it's cool:** The bundle on the FreeAgent Go drives also includes muvee Reveal software, a great application for creating music videos out of your home videos or photos. Purists may grumble about the additional bundled software, but it's a good move to offer customers something different. I love the muvee Reveal software, and having the ability to unlock a movie and watch it from the portable drive is an interesting feature.

▶ **Some caveats:** The three-device limitation is a bit restrictive; I'd like to see the ability for users to deauthorize a system if they upgrade their PCs. More movie choices and other Paramount-owned properties (TV show series?) would be nice, too.

▶ **Grade:** ★ ★ ★ ★

Shaw can be reached at kshaw@nww.com.

TRUE FACT

221 million

people in the U.S. are online, about 71% of the total population. By 2014, more than 77% (250 million) people will be online in the U.S.

SOURCE: EMARKETER

▶ **Gearhead,** *from page 16*

adding of numeric characters. This resulted in 46,823,788,660 possible passwords and the performance, as reported by AOPR, was about 580,000 attempts per second with an estimated running time of just under one day (I didn't bother letting it run to completion as my password isn't in any dictionary).

Overall, this is a very good product. My biggest complaint is that even though the mask creation system works adequately, I think Accentsoft seriously oversells its usability (it's definitely designed by engineers).

AOPR costs $60 for the CPU-only version; $120 for the standard version (CPU and one GPU); $200 for the professional version (CPU and two GPUs); and $350 for the ultimate license (CPU and unlimited GPUs).

If you have to recover an Office document that's locked by a password then Accent Office Password Recovery is definitely worth trying. I award AOPR a rating of 4 out of 5.

Gibbs can crack it in Ventura, Calif. Your attack to gearhead@gibbs.com.

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Cloud: Ready or not?

An innovation game changer

John Hagel III (pictured), co-chairman, Deloitte Center for the Edge; and Chris Weitz, director, Deloitte

CLOUD COMPUTING IS ALREADY KNOWN for its low upfront costs, speed of deployment and on-demand scalability, so yes, the cloud is ready for specific tasks. But this is just the beginning. We envision a whole series of disruptive outcomes that will drive much broader adoption of cloud computing and new ways of thinking about business management.

Cloud computing is facilitating business innovation in ways premise-based computing can't. It offers a different set of capabilities, creating new ways of obtaining value and inserting more agility into the enterprise.

We're seeing an impact on early adopters. Many growing small and midsize businesses use cloud computing services to lower IT investments and increase business agility. They can scale up and down, maximize efficiency, accelerate time to value, and reduce the time to start and complete work. Cloud computing avoids major capital expenditures by using services managed as operating expenses. It enables a reallocation of resources to other value-creating activities.

The most adopted cloud utility model is software-as-a-service in large enterprises, but cloud-enabled platform and infrastructure services are making market inroads. Many cloud vendors are known quantities with deep pockets, including Google and Amazon along with Salesforce.com, IBM, Oracle and Microsoft.

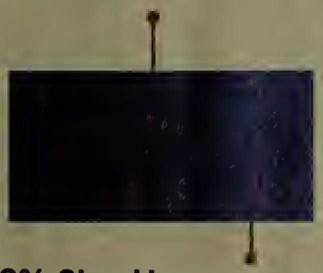
And those providers just entering the market? Working with them means enterprises must apply the usual due diligence. But this is standard practice in IT, and similar to the way IT has embraced other innovation waves in the past. Overall, cloud players are stronger than those in other service transitions of the recent past.

This is true even when it comes to security. Early indicators point to cloud security functions being on par with enterprise IT security functions. Granted, enterprises are just now understanding and implementing cloud security, so there will be a learning curve and corresponding exposures.

Looking ahead, the next wave of cloud computing is developing to address unmet enterprise needs. Companies today struggle to create shared platforms to accommodate complex extended business processes. We see widespread adoption

► *See* **Ready,** *page 20*

Is the cloud ready for enterprise computing?



Cast your vote and see comments at
tinyurl.com/y36tkql

Cloud computing isn't a panacea

James Staten, principal analyst, Forrester Research

CLOUD COMPUTING ISN'T THE BE-ALL, end-all that many portray, and it can't suit all uses today, and may not in the future, either.

But I'm still bullish on cloud computing. If you've been following Forrester's analysis of the cloud computing market, you already know this. Forrester believes cloud computing is one of the Top 15 technology trends in 2010 and that it warrants investment now so you can gain the experience necessary to take advantage of its many forms to transform your organization.

Tenancy, shared economics, virtualized deployment and cloud service-to-service integration are game changers for those who are using these services. Not only do they bring potential cost advantage to applications that might otherwise have been deployed on-premise, but they create opportunities for new business applications that simply aren't feasible any other way.

Like any emerging technology, however, you have to go in with your eyes open. It isn't as easy as some vendors make it sound, and if you get it wrong it can cost you more than you're hoping to save.

Cloud services can, in fact, save you money, particularly if you have applications with highly variable load. An application that normally consumes only 20% of a single server, but during heavy use can consume 10 servers, is a great fit for cloud deployment where you only pay for the virtual machines you light up. However, if that application has to take credit card transactions and your cloud provider won't let you audit its environment or won't provide the logging and reporting you need for PCI compliance, then it may cost you more to address these issues than what it would have cost to simply run it in your own data center.

Cloud providers will only go so far in providing security, management and reporting for their services. You have to fill in the gaps between what they provide and what your business requires. A recent concern among infrastructure-as-a-service (IaaS) customers has been visibility into cloud congestion in order to ensure application performance. There are no guarantees of performance from the cloud providers and certainly not performance as you may define it for a given application.

The same is true for availability. Where most

► *See* **Not** *ready, page 20*

▶ **Ready,** *from page 19*

of cloud computing coming from the "outside in," with orchestrators of large business ecosystems — non-technology companies that coordinate trade among thousands of highly specialized global partners in industries such as apparel and consumer electronics — becoming early adopters.

Addressing the needs of these orchestrators will require cloud suppliers to develop innovative technology architectures that cannot be easily replicated with traditional premise-based platforms. That could be a catalyst for driving cloud adoption not just by the orchestrators, but by all their business partners. Suppliers such as Rearden Commerce and TradeCard are already responding with newly developed cloud-based architectures to help coordinate complex processes across multiple enterprises.

With increasing scale and critical mass, innovative new architectures will likely position cloud computing vendors to replace large swaths of existing enterprise systems. The scaling of cloud computing to meet growing enterprise demand has the potential to drive a major restructuring of the IT industry.

Cloud computing will likely be a catalyst for disruption in industries like healthcare, biotech, financial services and energy, driving innovative new business models into these diverse industries.

As the technology matures, enterprises that have invested in legacy IT architectures are likely to find transitioning to the cloud a necessity if they are to compete successfully with more agile and innovative companies. Successfully making this transition will require the engagement of the CEO, top strategy executives and leaders of major business units, not just the CIO.

Cloud is ready to handle specific tasks today and it is not a passing phenomenon. It is gaining long-term momentum. ■

Deloitte LLP Center for the Edge conducts original research and develops substantive points of view for new corporate growth.

▶ **Not,** *from page 19*

public clouds will alert you when their services are out (and rebate you for time lost) they won't monitor your application. You have to do that. If your application hangs or fails, it is your responsibility to have a redundant deployment that can identify the problem and work around it. The same holds true with cloud outages.

Another issue most enterprises don't think about is the implication of where the cloud resources are based. Most cloud services aren't geographically ubiquitous. They are like any other Internet service, served up from a data center in a specific geography. And if you do business in multiple geographies you'll need to take into account various local privacy and data protection laws.

If you have European clients, you're subject to European privacy laws, which state that personal information on EU citizens must be stored in the EU. Right now, it's simply far too easy to run afoul of these laws. And it's you — not your cloud provider — who will carry the liability.

As you might expect, application developers are less concerned about compliance. They're focused on accelerating time-to-market and raising productivity, and they see cloud computing as a significant accelerator.

While IaaS clouds can deliver, the dynamic scaling involved can expose the company to risk if not managed, and that's the role IT needs to fill.

Don't try to stop your company from using cloud computing — that horse has already left the barn. Instead, create a use policy that serves as guardrails to protect your company as they move down this new path. ■

Staten is a principal analyst at Forrester Research, where he serves infrastructure and operations professionals and covers cloud computing. He will deliver a keynote address at Forrester IT Forum, May 26-28, in Las Vegas.

Cloud computing is a misnomer

How many IT decision makers can define the differences between Web 2.0, cloud computing, SaaS (including variations of XaaS) and hosting? All are nebulous buzzwords camouflaged as discerned platforms for the "right" business environment. Lack of crisp distinction can lead questioning IT folk to associate this "cloud stuff" with the defrocked application service providers. Cloud computing service providers need to uncloak themselves, otherwise the "will it offer savings" argument is premature. **MAURENE CAPLAN GREY**

Ask the wrong question, get the wrong answer

Is the cloud ready for the enterprise? Wrong question: The right question: What is the cloud ready to do? If you are a proponent of ITIL, the cloud isn't ready to take over traditional data center tasks. Try implementing a decent change management process when you don't have control over infrastructure upgrades. What's sad about the cloud is how little innovation we're seeing. It's more like open source ... which mimics existing capabilities rather than inventing new ones. **BOB LEWIS**

Is everyone crazy?

Any significant attack on DNS or something (anything?) else in the IP infrastructure will make ALL of the info unavailable. (On short notice, without warning.) Uh — eggs in a basket — single point of failure?. Yeah, Paranoia 101, again. **SNAPE**

1970's "Time sharing"

Remember that? Same song, 2nd verse. IMHO trust your data to the "cloud" if: 1) you have no data worth worrying about; or, 2) access to your data is not a mission-critical concern; and/or, 3) theft of you data is of no concern; or, 4) you're an idiot. **FEIGN**

Cloud computing could be ready if . . .

The onus for the state of cloud computing falls on those of us providing cloud computing services. Most of my peers have largely ignored growing concerns about security, reliability, transparency and accountability, and this has led to a general state of confusion and skepticism about the viability of cloud computing. No one argues that the technology holds great promise, but few companies have stepped up and deployed mission critical applications on the various cloud platforms available today because of these concerns. **DAVE GEADA, VP OF MARKETING, STRATASCALE**

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CLEAR CHOICE TEST: SOLID STATE DRIVES

SSDs offer alternative to hard disks

Beware of tradeoffs between performance, price and longevity

BY LOGAN G. HARBAUGH

Solid state drives offer substantial benefits over traditional hard drives – they are faster, more reliable, use less energy and are quieter.

On the negative side, they have lifespans that are limited to an average number of writes per cell, and they can cost as much as 70 times more per gigabyte as standard hard drives.

So, where do SSDs fit in an enterprise network? In servers? In storage systems? Somewhere else?

To address those questions, we reviewed a variety of SSD-based products from seven vendors. Three of the products were Peripheral Component Interconnect Express (PCIe) boards — an Adaptec MaxIQ 5805/512 controller, two Apricorn PCIe Drive Arrays, and a FusionIO ioDrive.

In addition, we tested two storage-area network (SAN) systems, a Compellent Storage Center 030 and a Dot Hill AssuredSAN 3730. Plus, we tested an HP BladeSystem c-class chassis with two server blades, each equipped with a 160GB StorageWorks IO accelerator module. And we looked at a Ritek 128GB SSD.

First, some definitions: There are two types of SSDs — single-level cell (SLC) and multi-level cell (MLC). SLC drives are faster, have longer lifespans (about 100,000 writes per cell) and cost more.

MLC drives are less expensive, but have typical lifespans of only about 10,000 writes per cell, making then generally inappropriate for write-intensive enterprise applications.

MLC drives can have a place in the enterprise for read-intensive applications such as serving videos or database lookups. They can speed throughput and access times at a lower cost than SLC drives.

SSDs are being used to replace standard hard drives in servers, but this is not typically the most effective way to use the drives. SLC-based SSDs are so much faster than standard hard drives that more than a couple of drives can overrun a standard storage controller.

Also, since SSDs typically are more reliable as well as more expensive than regular drives, using SSDs in a RAID configuration may not be the best use of the drives.

These issues are leading to new and different applications for SSDs. Some manufacturers are shipping PCI-X or PCIe boards that can either have SSDs (or discrete flash memory) directly mounted on them or attached via standard SAS or SATA cables.

Other vendors have created appliances that are placed between servers and storage, operating as cache to speed up access to the storage without having to add SSDs to specific storage arrays.

And some vendors have added SSDs to their existing SAN storage systems, either as cache or as another storage tier (often called tier 0).

This test covers all the categories of storage using SSDs except the appliances that sit between servers and storage. A number of vendors in that category were invited, including Atrato, Dataram, IBM, Schooner Information Technology, Solid Access Technologies, Storspeed, Teradata and Violin Memory, but none were able to get product to us in time for the review.

Our test bed included an HP ML370G5 server running Windows Server 2003 with external storage connected via Fibre Channel through a 2Gbps HP FC switch. Storage performance was tested with IOmeter running a mix of tests intended to show overall improvements in throughput, IOps and latency.

Each product was evaluated in the following areas: performance (throughput, IOps and latency), installation and documentation, ease of use, flexibility of configuration to suit differing network architectures and price/performance.

We found that performance gains with SSDs were dramatic, with anywhere from double to 10 times the performance of hard-drive-based systems. The two Fibre Channel arrays, from Compellent and Dot Hill, were limited only by the 2Gbps Fibre Channel interface and would have shown higher numbers with a 4Gbps or 8Gbps host bus adapter.

Internal storage has an advantage, as the PCI bus can sustain higher throughput and IOps than some external interfaces. With read and write throughput exceeding

NETRESULTS

Product	**ASR5805 SSD controller and MaxIQ kit**	**PCIe Drive Arrays**	**Storage Center 030**
Company	Adaptec www.adaptec.com	Apricorn www.apricorn.com	Compellent www.compellent.com
Price	$645 and for the MaxIQ Kit (CD software and one SSD) $1,295.	PCIe board only: $199, PCIe board with four MLC 256GB SSDs is $2,999.	$141,632, which includes all hardware and software licensing. SSDs are priced at $13,533 each.
Pros	Accelerates all internal drives in the system. Low price for excellent performance. Easy install.	Low price. Configuration is easy.	SSD performance can be easily added to an existing array, SSDs and standards hard drives can be mixed in one enclosure.
Cons	Still subject to write-cliff under intensive long write sessions, though not to the extent of others.	Board is 12.25-inches long. Write cliff.	Expensive
Score	4.55	3.8	4.7

700MBps, the fastest of these systems can shatter bottlenecks.

The 'write cliff' effect

One issue emerged during our testing that highlights a key difference between high-performance SSDs and consumer-grade ones. The consumer grade drives (the Adaptec, Apricorn, Dot Hill and Ritek systems) showed dramatic variations in response times (latency) under sustained write conditions, which some vendors are calling the 'write cliff'.

While performance numbers with the other systems remained constant from the beginning to the end of the test, the consumer-grade drives showed drop-offs in performance once the drive was filled for the first time and the drive's internal garbage collection and wear-leveling routines kicked in.

This only affects write performance — read performance is unchanged even with the consumer-grade drives.

These variations in response times were most marked with the single MLC-based Ritek drive and the Apricorn MLC-based array. But the other three (the Adaptec, Apricorn SLC-based array and DotHill system) showed the effect as well, with latencies varying from less than 1 millisecond to more than a second with the latter, and over 3 seconds with the first two.

In contrast, the Compellent, FusionIO and HP systems remained under 12 milliseconds even under extended sessions of 100% writes.

The enterprise drives don't have this issue because of over-provisioning — a drive labeled as 146GB may actually have a capacity of 300GB. Some of the systems also have optimized wear-leveling algorithms that only move data around when the drives are not being heavily utilized.

The trade-off is that the enterprise drives are also more expensive — while the Ritek 128GB drive has an MSRP of $400, the FusionIO modules are $6,829.99 for a 320GB unit, and Compellent 146GB drives are $11,000 each, with a minimum of three required.

The best bargain may be the Adaptec 5805 controller with the MaxIQ package — it accelerates any internal storage in the system, not merely drives connected to the controller. While it was subject to the "write cliff," adding more than one 64GB SLC SSD should help with this, and the cost for the system is quite low, at $645 for the controller and $1,295 for a single drive MaxIQ package.

If you have a write-intensive application such as a database, you'll want to look at something like the Compellent array, or the FusionIO and HP system cards, which offer very high performance, though at high prices.

If you're looking for high performance in applications that are read-intensive or don't require extended writes, any of the drives will perform better than most hard drives, and some of the solutions are quite inexpensive.

Vendor: Adaptec

Product: ASR5805/512 SSD controller and MaxIQ kit, with one SSD

The Adaptec kit consisted of an 8x PCIe controller and the MaxIQ a single SSD, an Intel SSDSA2SH064G1GC SLC 2.5-inch 3Gbps SATA drive. The MaxIQ kit is available separately from the controller, and will work with many recent Adaptec controllers.

You can use as many as four SSDs per controller to add capacity for writes, extending the envelope before the "write cliff" takes effect. SSDs can be removed or replaced at any time without affecting data on the hard drives, since all data is permanently stored on the hard disk drive or arrays. One caveat — the other PCIe cards we received were 4x, while the Adaptec is an 8x card, which means that some motherboards with only 4x slots will not support the card.

The Adaptec MaxIQ system will accelerate the performance of any direct-attached storage — SCSI, SATA or SAS arrays attached to internal controllers, but not Fibre Channel or iSCSI storage.

It achieved the highest number of IOps in our test, and over 500MBps of throughput, though under extended write-only sessions, performance became erratic after long periods of sustained writes (over 80 minutes of 500+ MBps).

Performance was up to six times better for drives in the server after the MaxIQ system was installed than before, a superb price-performance increase.

In addition, the boot drive for the system was accelerated as well, resulting in faster boot times and faster load times for applications, without the need to move application files to the SSD drives.

Installation was a simple matter of installing the board, connecting the SSD to the controller, powering the server up and installing the Adaptec drivers, with no tuning or moving of files required.

Finding an available power connector for the drive was an issue with the server we tested on — you'll want to make sure that there are extra power connectors for as many SSDs as you want to add.

While this system does limit server storage to internal drives, its ability to increase the performance of existing drives in a system and the relatively low cost of less than $2,000 for a controller and single-drive MaxIQ kit makes this a product anyone with performance bottlenecks should at least try, unless they're already using Fibre Channel or iSCSI storage.

AssuredSAN 3730 Array	**ioDrive 320GB**	**StorageWorks IO Accelerator for BladeSystem c-Class**	**NSSD-X25-128-C07M-PN**
Dot Hill Systems www.dothill.com	Fusion-IO www.fusionio.com	HP www.hp.com/	Ritek www.ritek.com
$36,158 as tested	$6,830	160GB, $7,700; BLc3000 enclosure $4,300 2 HP BL490c blades $8,022	MSRP $400
Relatively inexpensive; easy setup SAN system allows sharing with multiple servers.	Very high performance; no write cliff.	Very high performance; no write cliff; doesn't use extra space in chassis; installs on each blade as mezzanine card.	Least expensive; easy installation.
Write cliff.	Only 64-bit operating systems are supported; booting from device not supported.	Only 64-bit operating systems are supported; installation requires downloading drivers; expensive.	Write cliff.
3.75	**3.6**	**3.6**	**3.9**

SCORECARD

Product	Compellent	Adaptec	Ritek	Apricorn	DotHill	FusionIO	HP
Performance (25%)	5	4	3	4	3	5	5
Compatibility (20%)	5	4	5	3	4	3	3
Installation/ Docs (20%)	4	5	5	4	4	3	3
Manageability (25%)	5	5	3	4	4	3	3
Value (10%)	4	5	4	4	4	4	4
Total	**4.7**	**4.55**	**3.9**	**3.8**	**3.75**	**3.6**	**3.6**

SCORING KEY: 5: EXCEPTIONAL; 4: VERY GOOD; 3: AVERAGE; 2: BELOW AVERAGE; 1: SUBPAR OR NOT AVAILABLE

Vendor: Apricorn

Product: PCIe Drive Arrays

Apricorn sent us two of their boards, which consist of a 4x PCIe RAID controller with four mounts for 2.5 inch SATA drives. The drives can be either hard drives or SSDs.

One of the boards had four 64GB consumer-grade MLC-based SSDs, two Samsung and two PQI drives. The other board had four 80GB Intel SSDSA2MH080G1GN 3Gbps SLC-based 2.5 inch SATA drives. The Intel drives, while more expensive, offered much higher performance and were much less affected by the "write cliff" effect. Installing the boards was very straightforward, with just a driver to be installed after the board was installed. The board can be purchased separately for $199, which means that you don't have to buy marked-up drives from Apricorn — you can shop for the best deal. Since the drives are mounted directly on the controller, you don't need to find power connectors for the drives as you do with the Adaptec.

Vendor: Compellent

Product: Storage Center 030

Storage array vendors have generally created arrays that either use SSDs as cache or as a tier 0, but Compellent has created a hybrid of both. SSDs can be added to an existing drive shelf, and can be mingled with SAS 15k standard hard drives. The drives do have to be added in groups of at least two, and a hot spare is also required, so the minimum number of drives is three.

In our test system, there were two SSDs in one shelf and three in another, producing a total of about 300GB. At a cost of $55,000 for the SSDs, this doesn't seem to be a great value, since the internal controllers achieved higher performance at much lower costs, but the Compellent system did not suffer from the write cliff and the system was able to handle five servers running IOmeter without performance degradation, something none of the other systems in this test could do.

A system using 8Gbps Fibre Channel controllers, which Compellent will support this year, should be able to achieve IOps and throughput numbers comparable to the internal controllers, but with the ability to support multiple servers and scale to much higher capacities.

Compellent optimizes the use of SSDs through its Automatic Data Progression technology, which moves files in use to the fastest tier of storage available. While you can designate specific volumes to be run only on SSDs, if you use the default settings, the most-used files are automatically moved to the SSDs, and if they aren't used for a while, they are automatically migrated to slower drives.

This ensures that the SSDs are fully utilized, and can effectively accelerate performance for the entire storage system without requiring a large number of SSDs. While the cost of the system is higher than the others in this test, it also offers more features and much greater scalability.

Vendor: Dot Hill

Product: AssuredSAN 3730 Array

Unlike the Compellent array, the Dot Hill AssuredSAN 3730 that we received had only SSDs. The system was a 2U (3.75-inch high) chassis with 12 32GB Intel SSDSA2SH-032G1GN SLC-based 2.5-inch 3Gbps SATA drives, dual two-port Fibre Channel controllers and dual power supplies. Installation was simple, and the interface was straightforward and easy to use.

The DotHill system does not have all the features of the Compellent system, but does include snapshots, volume copy and multipath. It is also much less expensive, though it did not achieve the same levels of performance, either with a single server or with multiple servers attached.

Vendor: FusionIO

Product: ioDrive 320GB

The FusionIO system is different from all others in that it doesn't use SSD drives, instead having proprietary flash memory mounted directly to the board.

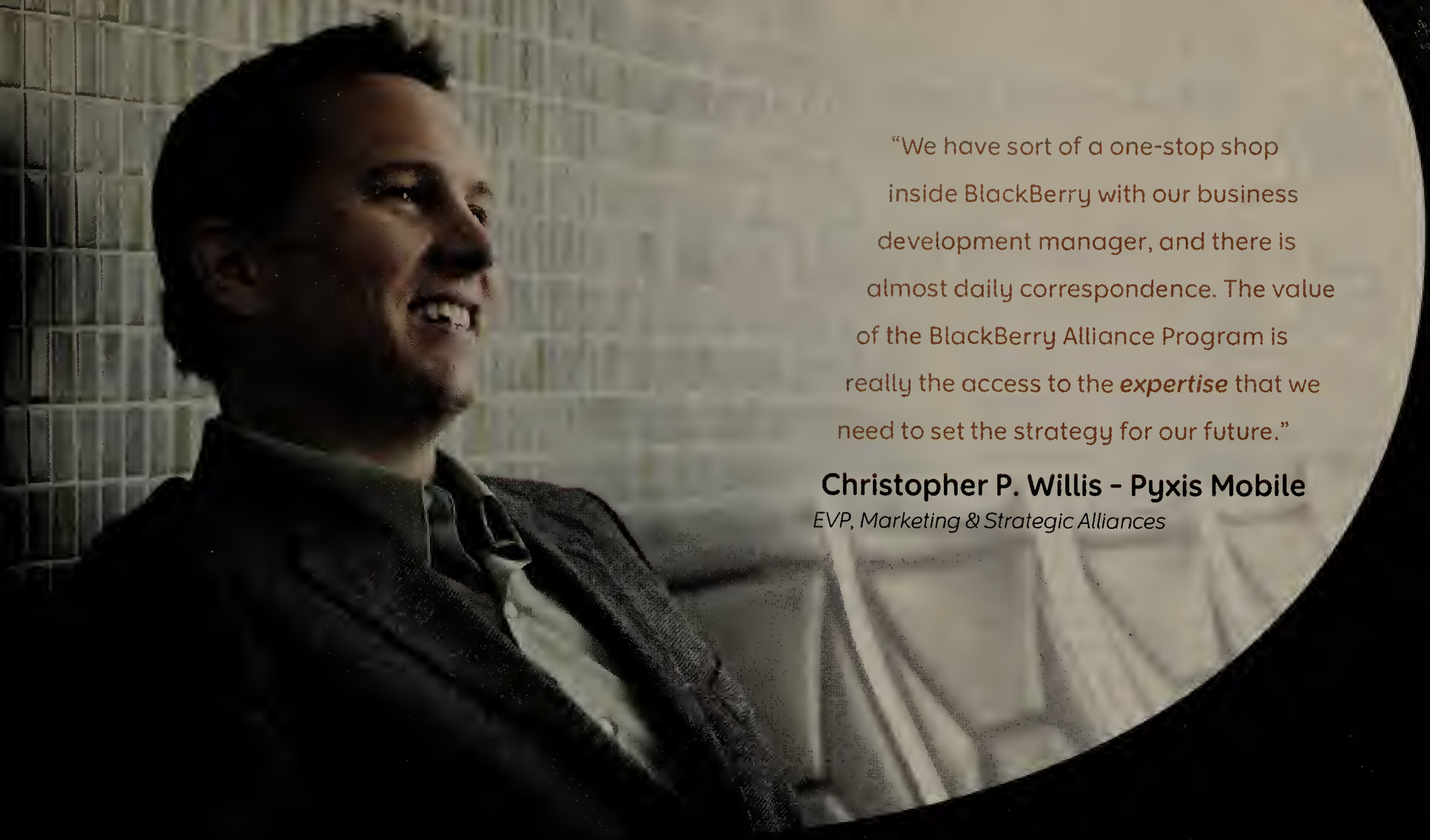
It achieved the highest throughput in the test (the HP StorageWorks IO Accelerator is also made by FusionIO) with over 700MBps on reads and over 500MBps on writes and excellent IOps, with no write cliff.

Installing the FusionIO system does require more research in advance than the other internal controllers we tested. It requires 64-bit versions of Windows, which is not an issue with Windows Server 2008 R2, but if you're running earlier versions, you'll need to make sure you're running 64-bit.

A small issue was that the included USB key only has documentation — the drivers must be downloaded from the Web site. The drive also cannot be used as a boot drive, though FusionIO is working to make this possible.

Once the drivers are downloaded, installing the board is straightforward. Because the flash memory is mounted on the board, the only way to expand the storage is to add another board. Once the drivers are installed, the board shows up as another drive, which can then be mounted. The only decision you'll need to make is the level of write-optimization to support — there are three modes.

While the FusionIO system is not inexpensive at $6,829.99 for the 320GB version, and is not readily expandable, it offers very high throughput with very low latencies.



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Making the best use of SSDs

Many of the standard ways that hard drives are used may not be appropriate for SSDs. Putting SSDs in a RAID 5 array, for instance, may make the RAID controller the bottleneck in the storage system. In addition this ensures that all the drives in the array could fail at that same time, since writes are distributed evenly over all drives, and wear-leveling algorithms on the drives cause all cells to wear evenly as well. This means that if the drives reach their limits on writes at the same time, all the drives in an array could fail at about the same time.

Since the mean time between failure for SSDs is higher than for hard drives, the best solution might be to implement a JBOD (just a bunch of disks) and use replication for fault tolerance. None of the vendors I spoke with currently offer monitoring of the remaining number of writes available on SSDs, though several say they are working on this.

— Logan G. Harbaugh

Vendor: HP
Product: StorageWorks IO Accelerator for BladeSystem c-Class

The HP StorageWorks IO Accelerator for BladeSystem c-Class is a mezzanine card that can be installed in HP blades in the c3000 and c7000 BladeSystem enclosures. The accelerator is installed on each blade, and is essentially a specialized version of the FusionIO card — it doesn't accelerate storage performance for other storage in the system like the Adaptec MaxIQ, and one per blade is required, rather than one per enclosure.

The test system we received included the HP c3000 enclosure with two HP ProLiant BL460c G6 server blade, each with a 74GB 10k SAS 2.5-inch boot drive and a 160GB SLC-based accelerator module.

Performance was very high — over 800MBps on reads and over 600MBps on writes, very high IOps and very low latencies, with no drop in performance during extended write tests. The higher performance for the HP version as opposed to the FusionIO version is probably because the 320GB version that FusionIO sent us uses MLC-based flash, while the 160GB versions in the HP blades are SLC-based.

Like the FusionIO card the HP card requires a 64-bit operating system, doesn't operate as a boot device, and isn't expandable.

Vendor: Ritek
Product: NSSD-X25-128-C07M-PN

The Ritek NSSD-X25-128-C07M-PN drive we received is a standard consumer-grade MLC-based SSD, a 3Gbps 2.5-inch SATA drive. While its performance seems relatively low, this is a single drive and shouldn't be compared with anything other than the single SATA HD in the baseline server. Compared to that, it offers two to 10 times the performance of a hard drive, with much lower power consumption as well, and at a price that not much more than a single 15k SAS 146GB hard drive.

While performance suffered dramatically during extended write tests, read performance remained great. Installation is no more difficult than any other drive, with no drivers or other software required, and boot times can be reduced dramatically with this type of drive.

While the Ritek we tested is an MLC-based drive, SLC-based drives are also available, which should offer enhanced performance, especially on write speeds.

Summary

SSDs can produce higher performance than standard hard drives, though you will need to choose carefully to ensure that the SSDs you pick are matched to your application.

Applications that write large amounts of data over extended periods of time will need write-optimized SSDs, which are more expensive than consumer-grade drives. ■

Harbaugh is a freelance reviewer and IT consultant in Redding, Calif. He can be reached at logan@lharba.com.

SSDs beat hard drives in performance testing

But some products suffer performance degradation under sustained writes.

Product	IOps	Read IOps	Write IOps	MBps	Read MBps	Write MBps	Write Cliff
Baseline Server: 1 SATA hard drive	3,401	2,207	3,401	22	18	22	NA
Adaptec	89,326	79,592	89,326	540	480	540	Yes
Apricorn SLC SSD	49,138	49,138	22,600	705	705	272	Yes
Apricorn MLC SSD	24,470	24,470	3,630	218	218	78	Yes
Compellent	48,527	48,527	27,848	245	219	160	No
DotHill	38,844	38,844	12,175	229	189	195	Yes
FusionIO	30,913	30,913	26,977	706	706	456	No
HP IO Accelerator	61,122	61,122	58,974	806	806	618	No
Ritek1	15,345	5,015	15,345	179	179	154	Yes

Reasons for supporting IPv6 continue to pile up

BY CAROLYN DUFFY MARSAN

NETWORK AND Web site operators are coming under increasing pressure to support IPv6 — the long-anticipated upgrade to the Internet's main communications protocol — as more market indicators point to the rapid depletion of addresses for IPv4.

The Number Resource Organization (NRO) announced last week that only 8% of IPv4 addresses remain unallocated. The NRO consists of the five Regional Internet Registries, which dole out blocks of IPv4 and IPv6 address space to carriers.

The NRO's latest figures are significant because the Internet infrastructure must be upgraded to support both IPv4 and IPv6. IPv4 uses 32-bit addresses and can support 4.3 billion devices connected directly to the Internet. IPv6, on the other hand, uses 128-bit addresses and supports a virtually unlimited number of devices.

When IPv4 addresses run out — which is projected to occur in 2011 or 2012 — carriers including Verizon and Comcast plan to provide their customers with IPv6 addresses.

Meanwhile, Web site operators such as Google and Netflix are adopting IPv6 so that users with IPv6 addresses can view their content.

Despite the efforts of these IPv6 pioneers, the NRO says the Internet industry is not prepared for IPv4 address space to run out.

To demonstrate that IPv6 deployment is happening too slowly, the NRO quoted statistics from an April Organisation for Economic Cooperation and Development (OECD) report that said only 5.5% of the world's addressable IP networks can handle traffic over IPv6.

The OECD report also says less than 0.1% of U.S. users have adopted IPv6. But this miniscule amount is enough to put the United States in fourth place in terms of the percentage of IPv6-capable users. The leaders are: France, with 1% of users having adopted IPv6; China with 0.4%; and Sweden with 0.1%.

IPv6-enabled Web content also lags. The OECD report also said that just 1.45% of the world's 1,000 most visited Web sites have IPv6 support.

In response to these statistics, the NRO is urging governments around the world to make IPv6 readiness a top priority.

"National governments play a hugely important role in helping to accelerate IPv6 adoption worldwide," said Axel Pawlik, chair of the NRO, in a statement. "They have to lead the way by making their own content and services available over IPv6 and encouraging IPv6 deployment efforts amongst private sector organizations."

IPv6 adoption rates

With only 8% of IPv4 addresses left unallocated, the world is slowly turning to IPv6. France leads the way 1% of its users having adopted IPv6, according to the Organisation for Economic Cooperation and Development.

France	1%
China	0.4%
Sweden	0.1%
United States	-0.1%

Feds ready IPv6 portal

An early proponent of IPv6, the U.S. federal government appears to be out in front of the NRO recommendations.

The General Services Administration is preparing the federal government's main Web site — the www.usa.gov portal — to support IPv6 in production mode. But the agency hasn't released a target date for when IPv6 services will be available on the site.

"The usa.gov infrastructure provided by the hosting vendor is fully capable of supporting IPv6. Additionally, all major components and operating systems used by usa.gov are IPv6 capable. [There] is no specific date to fully transition to IPv6 at this point in time, but we plan on keeping in time with the industry [as] it progresses in this transition," a GSA spokesman said in response to a recent query.

Meanwhile, the Federal Acquisition Regulation (FAR) is being changed as of July 1 to require U.S. agencies to buy IT hardware and software that has been tested for IPv6 readiness by a third-party lab approved by the National Institute of Standards and Technology.

"More suppliers are putting IPv6 capabilities into their products because of the FAR change," says John Curran, president and CEO of the American Registry for Internet Numbers (ARIN), which provides IP address space to U.S. carriers and enterprises.

Curran says router manufacturers already support IPv6 because of the U.S. government's earlier requirement that all of its backbone networks be capable of passing IPv6 packets by June 2008. Now, the U.S. government is requiring built-in IPv6 support in all of the IT systems that it purchases.

"My advice . . to companies providing hardware or software is that the demand curve for IPv6 is going from zero to most of your customers, and it will happen over a short number of months next year," Curran says. "If you don't have products ready, your customers will go elsewhere."

Curran says all of the statistics he is tracking indicate that government agencies, businesses and other organizations need to move quickly to add IPv6 support to their public-facing Web sites and services.

"They will be at a disadvantage if their public servers are not IPv4 and IPv6 connected," Curran says. "The disadvantage is that they won't see information from IPv6-connected broadband customers. . . . They may have performance problems with online audio and online video streaming because it will be harder and harder to control the quality."

Curran says CIOs are waiting to adopt IPv6 because their trading partners and customers aren't asking for IPv6 connectivity yet. But he says it will be less expensive for them to adopt IPv6 sooner rather than later.

"It's much easier to put IPv6 in your ongoing development cycle and to do it as part of your normal upgrade cycle," Curran says. "Otherwise, you may find yourself a year and a half from now where you've got IPv6-enabled customers. You'll want to do [IPv6] at the same time that millions of other businesses in the U.S. are trying do the exact same work. You'll be under the gun, and you'll have to pay a premium for the know-how and expertise."

Curran says IPv6 transition issues will dominate the agenda at an ARIN meeting being held this week in Toronto.

As another sign of the momentum of IPv6, NTT Communications said last week it is planning a worldwide rollout of a VPN service that supports both IPv4 and IPv6. The service will be available in Japan, South Korea, Taiwan, Hong Kong and Singapore starting on April 15.

NTT says its dual-stack VPN service is based on MPLS, which will make it easier for enterprises to retain their existing IPv4 network architectures as they gradually transition to IPv6. ■

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Network World's Interop Planning Guide

Cloud computing is the big story at Interop Las Vegas

BRAD REED, NETWORK WORLD

TO SAY that this year's Interop will feature a lot on cloud computing would be an understatement.

Interop's goal this year seems to be to leave no cloud unturned, as its sessions explore topics ranging from optimizing cloud computing to navigating different cloud standards to the economics of the technology.

"Clearly cloud computing is a game changer and it's one technology that we think people need to know about," says Interop General Manager Lenny Heymann. "In fact on Wednesday morning our keynote speeches largely revolve around cloud computing."

Of course, cloud computing is only one of the many topics experts at Interop are due to discuss this year. If you're not interested in the cloud, you can always attend sessions on virtualization, mobility, VoIP and more. This Interop Planning Guide should help you pick out the most interesting sessions with the most relevant speakers to match your area of expertise.

Tuesday, April 27

10:15 a.m.

➲ Speedometers and Roofracks: The Cloud Ecosystem

What, exactly, makes up cloud computing? The answer is nobody really knows, as the entire ecosystem is still in a state of flux. This talk with Bitcurrent founder Alistair Croll will attempt to show you what parts of the cloud are central to its essence and what parts are merely nice options to have.

ALISTAIR CROLL – Founder, Bitcurrent

10:15 a.m.

➲ Virtualization Primer: Terms, Trends and Technologies

Think of this as Virtualization 101. Focus Consulting President Barb Goldworm will give you a concise breakdown of all the different types of virtualization and what they can do for your IT network. Topics include server virtualization, hypervisors, OS virtualization, hardware assists, virtual desktop architectures, and application streaming and isolation.

BARB GOLDWORM – President and chief analyst, Focus

11:30 a.m.

➲ How Virtualization Can Enable and Improve Disaster Recovery for Any Sized Business

With earthquakes, hurricanes and other major disasters wreaking havoc on the world, disaster recovery has become a key worry for many IT departments. This panel will provide some ideas on how to leverage virtualization to improve your disaster-recovery plans.

MODERATOR - BARB GOLDWORM – President and chief analyst, Focus

JOEL MCKELVEY – Technical alliance manager, NetApp

GEORGE PRADEL – Senior director of strategic alliances, Vizioncore

2:45 p.m.

➲ Delivering Business Value with a Comprehensive Green Data Center Framework

This session's goal is to provide data center managers with a comprehensive road map to transition their technology to energy-saving "green" IT. The basic idea behind the panel is that investing in energy-saving technology today will help you save money in the long term even if it temporarily expands your budget.

MODERATOR - DOUG WASHBURN – Analyst infrastructure and operations, Forrester Research

SHEHZAD MERCHANT – Senior director, Strategy, Extreme Networks

TATE CANTRELL – CTO, Verne Global

ROBERT PETROCELLI – CEO, GreenBytes

2:45 p.m.

➲ Virtualization — Life in the Trenches Is virtualization really all it's cracked up to be?

That's the question this panel will try to answer as it goes through several of the dos and don'ts for companies looking to take the plunge into a virtualized environment.

MODERATOR - BARB GOLDWORM – President and chief analyst, Focus

TORY LONG – Solutions Architect, U.S. Unified Computing Services, Cisco

JEREMY PACK – Virtualization and Infrastructure Consulting, HP Services

SEAN CONNELLY – Senior Manager, System Integrators and Emerging Products Group, Citrix

//PICKOFTHEDAY//

2:45 p.m.

➲ Why Networking Must Fundamentally Change

JIM METZLER

One of the big themes at this year's Interop will be how breakthrough technologies such as cloud computing and virtualization will impact the traditional networking model. This two-hour mega-panel attempts to provide answers to how data center LANs can best support virtualization and how data center automation may change in response to evolving technologies.

MODERATOR - JIM METZLER – Vice president, Ashton Metzler & Associates

DOUG GOURLAY – Vice president of marketing, Arista Networks

MANISH MUTHAL – Director, Enterprise Solutions, LSI

THOMAS SCHEIBE – Director, Datacenter Switching and Services Group, Cisco

KEN FERDERER – CTO, LineSider Technologies

RICK KAGAN – Vice president of marketing, Infoblox

KEN OESTREICH – VP, Marketing, Egenera

LARRY HART – Senior global manager, Product Planning/Management/Marketing, Dell

PAUL CONGDON – CTO for HP ProCurve and an HP Fellow, HP ProCurve

DHRITIMAN DASGUPTA – Senior product marketing manager, Fabric and Switching Technologies, Juniper Networks

4 p.m.

➲ Wi-Fi 2015 – The Next Five Years

Although 4G wireless technologies such as LTE and WiMAX figure to make a huge impact on the mobile broadband market, Wi-Fi will still remain a vital tool for companies that want to provide their employees with inexpensive and reliable indoor broadband coverage. This session will take a look at how Wi-Fi is slated to evolve over the next five years and how companies can adapt their wireless

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LANs to meet demand for the new technology.

MODERATOR - EDGAR FIGUEROA - CEO, Wi-Fi Alliance

ROLF DE VEGT - Director technical standards, Qualcomm

DOROTHY STANLEY - Senior standards architect, Aruba Networks

BEN GUDERIAN - Vice president wireless solutions, Polycom

LIAM QUINN - CTO, Business Client Product Group, Dell

4 p.m.

➲ Application Acceleration from a Data Storage Perspective

While storage isn't the only enterprise application out there, it is the application that is often most crucial to other apps' performance. This lecture will look at how to best utilize storage technology to improve application performance and will include topics such as spindle aggregation, various storage acceleration devices, application-level QoS techniques, and caching.

JACOB FARMER - CTO, Cambridge Computer Services

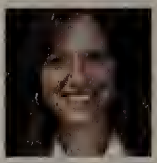
Wednesday, April 28

//PICKOFTHEDAY//

10:15 a.m.

➲ Planning for (and Deploying!) 4G

4G mobile broadband technology will be ubiquitous in just a couple of years, as all the major U.S. carriers will have deployed some variation of 4G by the end of 2012. This panel will try to help businesses understand what high-speed mobile broadband will mean for them.



SUE MAREK

MODERATOR - SUE MAREK - Editor-in-chief, FierceMarkets

CHRIS PEARSON - President, 3G Americas

MOHAN TRIKUR - Director, Core Network Solutions, Ericsson

TERESA KELLETT - Director, 4G, Sprint Nextel

ATUL BHATNAGA - President and CEO, Ixia

10:15 a.m.

➲ Portable Clouds: Navigating Cloud Standards

As we've seen in the past, "cloud computing" is somewhat difficult to define. This panel, moderated by Cloudera Vice President of Customer Solutions Omer Trajman, will look at different cloud standards with an eye toward integrating them all into a single interoperable cloud platform.

MODERATOR - OMER TRAJMAN - Vice president customer solutions, Cloudera

THORSTEN VON EICKEN - CTO and Founder, RightScale

JASON LOCHHEAD - CTO of hosting services, Terremark Worldwide

ELLEN RUBIN - Vice president of products, CloudSwitch

2 p.m.

➲ Cloud Law: Governance and Compliance in an On-Demand World

While cloud computing has become more popular over the past couple of years, the cloud market itself is sort of like the Wild West since there is still no operational definition for what constitutes a cloud service. Bitcurrent founder Alistair Croll will lead this discussion on how to apply best practices to cloud computing and how to deal with what Interop calls "the thorniest legal issues surrounding cloud computing."

ALISTAIR CROLL - Founder, Bitcurrent

2 p.m.

➲ What's Possible and What's Probable: Deciphering the Website Security Landscape

The point of this panel is fairly straightforward: two security experts will discuss what threats are out there and help users understand which of these threats are most likely to hurt their Web sites.

JEREMIAH GROSSMAN - CTO, WhiteHat Security

ALEX HUTTON - Research and intelligence principal, Verizon Business

2 p.m.

➲ DEEP DIVE — Network Requirements for Enterprise Video Conferencing

Everyone loves the potential of video conferencing to help workers talk with each other over an HD video stream and get work done efficiently from remote locations. There's just one problem, of course – high-quality video conferencing sucks up a lot of bandwidth and takes a lot of resources to manage. This panel will give IT departments insight on how to best configure their networks to support this very important, but also very bandwidth-intensive, application.

MODERATOR JOHN BARTLETT - Voice Video and Data Application Performance, NetForecast

WILLIAM CHOE - Director, Product Management,

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MATT SHERROD - Senior director, Product Management, CA

MAURICIO SANCHEZ - Chief security architect, HP

SEAMUS HOURIHAN - Vice president of marketing and product management, Acme Packet

//PICKOFTHEDAY//

3:15 p.m.

➲ Mobile Security — New Challenges, Practical Solutions

IPhones, iPads, BlackBerries, Android phones... the number of mobile devices that people want to bring into the workplace has exploded over the past three years. This session will try to beef up IT departments' knowledge of the latest and most troubling mobile security threats and help them walk the line between letting users bring their favorite devices to work and leaving their networks open to attack.

MODERATOR- ALEX WOLFE - Editor-in-chief, InformationWeek.com

RYAN NARAINE - Senior security evangelist, Kaspersky Lab

DAVID PERRY - Global director of education, Trend Micro

JAY BARBOUR - Security advisor, BlackBerry Security Group, Research In Motion

KHOI NGUYEN - Group product manager, Mobile Security and Management Group, Symantec Corporation

3:15 p.m.

➲ IP Telephony Market Update: Winners & Losers

In this discussion, TEQConsult President Allan Sulkin will tell you what VoIP companies have emerged in a good position coming out of the recent economic recession.

ALLAN SULKIN - President TEQConsult Group

Thursday, April 29

9 a.m.

➲ What Virtualization Means to the Branch Office

Branch offices just aren't what they used to be. Rather than having a separate server for storage at individual branch offices, many firms today are trying to save money by moving their storage to one virtualized data center. This panel's goal is to help users understand ways to overcome performance issues in branch offices that can no longer rely upon their own on-premise equipment.

MODERATOR - JIM METZLER - Vice president, Ashton Metzler & Associates

APURVA DAVE - Vice president of product marketing, Riverbed Technology

ABHINAV BISARYA - Product marketing manager, Juniper Networks

SHASHI KIRAN - Senior manager, Cisco

MARK MCREYNOLDS - Principal technology specialist, Microsoft

10:15 a.m.

➲ The Big Upgrade: 802.11n in the Enterprise

The latest Wi-Fi standard will provide a vastly wider radius of indoor wireless coverage. Enterprises that are frustrated by the limitations of Wi-Fi technology will want to take a hard look at the newest standard, which was first released last October. This panel will tell you everything you want to know about 802.11n, including channel planning, device issues, system architecture and wireless network management.

MODERATOR - LISA PHIFER - President, Core Competence

BOB O'HARA - Independent consultant

JOE EPSTEIN - Senior director of technology, Meru Networks

JIM GEIER - Principal consultant, Wireless-Nets

//PICKOFTHEDAY//

11:15 a.m.

➲ Bridging the Wired/Wireless Gap: Unified Networking Arrives

We've all been waiting for wired and wireless technologies to converge for years. But now it looks as though wireless has evolved to the point where true fixed-mobile convergence might finally become a reality. This panel will go in depth about all the benefits and drawbacks that this new converged world has to offer.

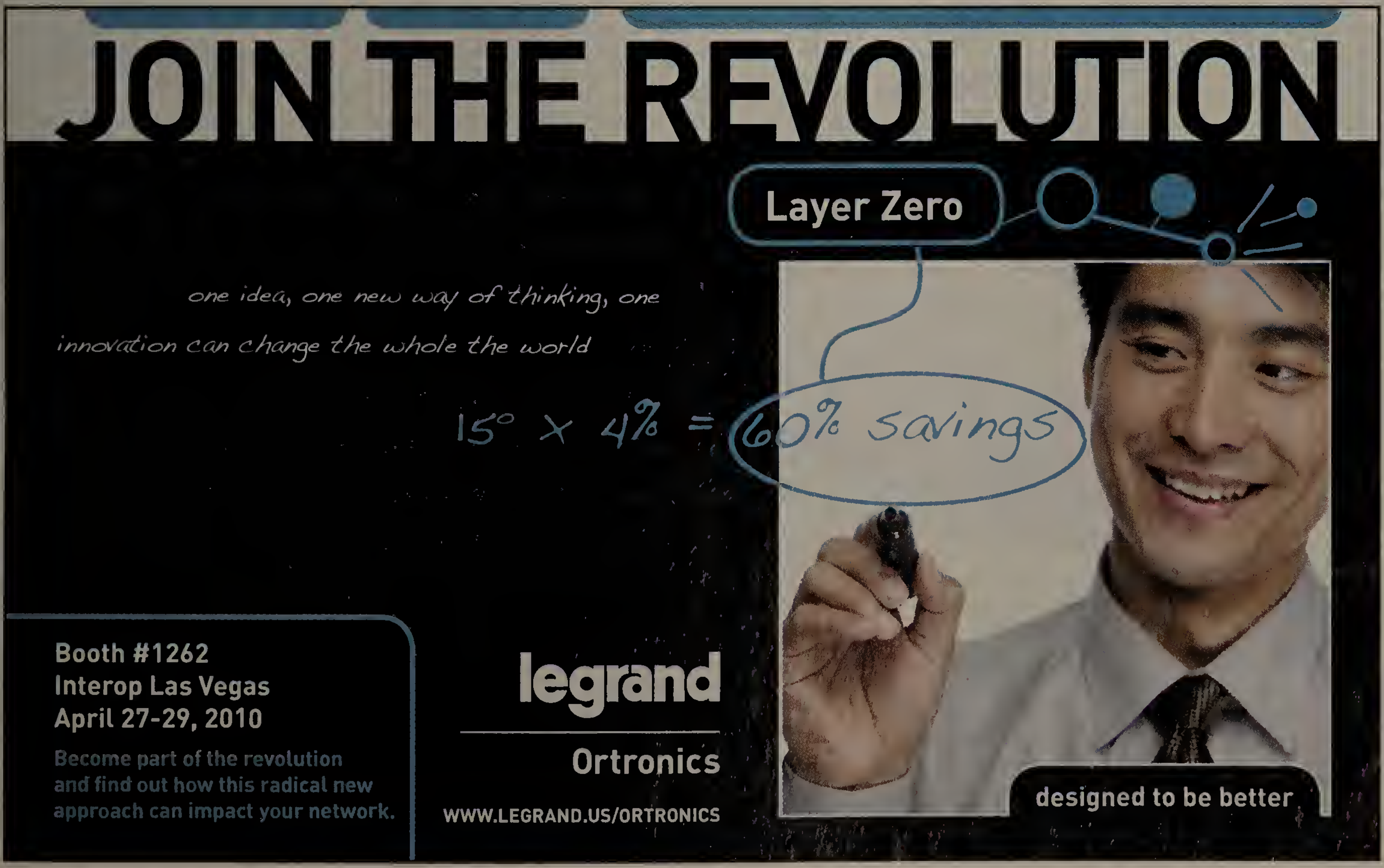
MODERATOR - CRAIG MATHIAS - Principal, Farpoint Group

CHRIS KOZUP - Senior manager mobility solutions, Cisco

SCOTT LINDSAY - Senior director global product line management, Mobility and Voice Products, 3Com

RAD SETHURAMAN - Senior director product management, Motorola

MANAV KHURANA - Head of industry solutions, Aruba Networks



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Editorial Index

Accentsoft 16
Adaptec 22
Amazon................................ 6
Apple 8, 34
Apricorn 22
AT&T 8
Atrato 22
Certiport 1
Cisco 8, 9, 10, 12, 17
Comcast............................ 27
Compellent 22
Dataram 22
Dell 10
Dice 12
Dot Hill Systems 22
Emulex 10
Fusion-IO 22
Google 6, 27
GT Nexus 6
HP 22
IBM 22
Microsoft 6, 12, 16
Netflix 27
Network Hardware Resale 9
Ritek 22
SAP 6
Schooner Information Technology 22
Seagate............................. 17
Solid Access Technologies 22
Sonicwall 9
Sprint 8
Storspeed 22
Teradata 22
Verizon 8, 27
Violin Memory 22
VMware............................. 12

Advertiser Index

Advertiser	Page #	URL
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Citrix Systems Inc.	7	Citrix.com/SimplicityIsPower
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To Send E-Mail to NWW Staff
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BACKSPIN | BY MARK GIBBS

Fighting piracy with coercion

COERCION SOUNDS ugly yet, in the form of laws, it is actually a foundation of civilization. The entry on coercion on the Stanford Encyclopedia of Philosophy site says: "It helps keep the bloody minded and recalcitrant from harming others, and seems also to be an indispensable technique in the rearing of children."

It would seem that we humans need coercion to keep the wheels of society oiled. But while social coercion is justified, there are unjustifiable forms of coercion that are obviously based on the abuse of law.

Consider the following: A company, the U.S. Copyright Group, formed by a group of lawyers at the behest of "an ad hoc coalition of independent film producers," has set out to coerce BitTorrent users into settling out of court for illegal movie downloads.

According to a story by The Hollywood Reporter on March 30, the U.S. Copyright Group has already filed court actions on some 20,000 users and around 30,000 other suits are in the works.

Most of the cases so far have involved relatively obscure independent films. The reason that the major movies aren't involved is that — despite expressing interest — they "wanted to see proof that [Internet Service Providers] would be cooperative."

Underlying the program is a service provided by a German company, Guardaley IT, that uses "real-time monitoring" of BitTorrent transfers to identify movie downloads then captures IP addresses and time stamps them. The IP addresses are traced and the originating ISPs are then subpoenaed to reveal the identity of the associated user. Finally, assuming the ISPs play ball, legal action starts and the users are offered the choice of defending themselves in court or settling out of court.

Of course, there is no way it can be guaranteed that all of the accused users are really guilty; ISPs make mistakes, hackers can fake IP addresses . . . there are scores of ways the innocent can be misidentified. But the expectation of the U.S. Copyright Group and the filmmakers they represent is that the majority of accused users (whether guilty or not) will choose to pay up as the cost of litigation could be orders of magnitude greater.

One of the lawyers involved in the U.S. Copyright Group explained the plan as, "We're creating a revenue stream and monetizing the equivalent of an alternative distribution channel."

Just reflect on that statement for a moment. The weasely obfuscation is a work of art. It sounds like a business plan despite being another way of saying, "We're shaking the punters down." Even the domain name of the company, savecinema.org, manages to sound like a noble nonprofit despite the enterprise being decidedly for-profit.

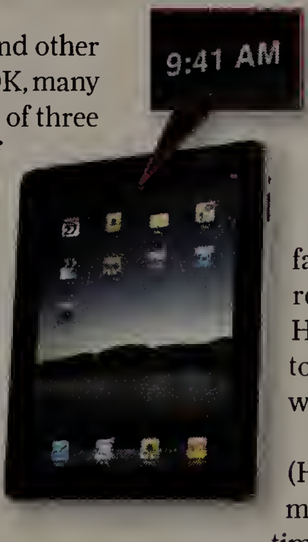
Apparently some ISPs are charging as much as $60 for each account revealed. This is bad news because, should the major studios decide to join in and retain the U.S. Copyright Group, the number of users accused could quickly balloon into the hundreds of thousands, giving the ISPs a serious financial motivation to comply.

No one condones piracy but this scheme is not a sensible way to solve the problem; it is simply a way for a bunch of lawyers to make money. If anything could underline just how much copyright laws need overhauling, this corrupt example of legal coercion has to be the poster child. ■

Gibbs doesn't want to get fingered while downloading the latest Ubuntu release in Ventura, Calif. Tell backspin@gibbs.com how safe you feel.

NETBUZZ | BY PAUL MCNAMARA

There's trivia and then there's Apple trivia



THE QUESTION has caused me and other trivia fans many a sleepless night (OK, many a fruitless hour) for the better part of three years: Why in the name of Steve Jobs does every picture of every iPhone in every Apple ad show the time as 9:42?

I had taken a shot at answering the riddle back in June 2007 by dutifully asking Apple public relations for an explanation. A spokesperson told me she would "try to find an answer," but, alas, she failed. I moved on, reluctantly.

Fast-forward to earlier this month and a blog post by Jon Manning, lead developer at Secret Lab, which makes software for the Mac, iPhone and iPad. Manning noticed two things of importance on Saturday, April 3: first, that the iPad making its retail debut that day shows a time of 9:41, not 9:42, in promotional photographs; and second, that the fellow standing over there in the Palo Alto Apple store appeared to be Scott Forstall, senior vice president of iPhone software.

Manning walked over to Forstall and asked the question that's been bugging (some of) us for years. Here's how it went:

Forstall: "We design the (product launch) keynotes so that the big reveal of the product happens around 40 minutes into the presentation. When the big image of the product appears on screen, we want the time shown to be close to the actual time on the audience's watches. But we know we won't hit 40 minutes exactly."

Manning: "So you add a couple of minutes?"

Forstall: "Yeah! And for the iPhone, we made it 42 minutes. It turned out we were pretty accurate with that estimate, so for the iPad, we made it 41 minutes. And there you are -- the secret of the magic time."

What a relief.

Now, it should be noted that others had speculated as far back as 2007 that the time in the photos was somehow related to the time of the initial iPhone announcement. However, this was the first I had heard of Apple looking to synch that time on the pictures with the time on the watches of audience members.

Thanks for asking, Jon, and thanks for answering, Scott. (However, I admit that it's not at all clear to me why it should matter that the time on the keynote photos should match the time on the watches ... I mean other than to demonstrate that Apple leaves no stone unturned when it comes to attention to detail).

And some of you are saying, "Who cares about any of this?"

It's a fair enough question, but the answer is a whole lot of people care, at least if traffic numbers to Buzzblog are any indication. Since that item was posted on April 7, it has attracted more than 138,000 visitors, which makes it the most-read post since Buzzblog debuted in early 2006. And a few thousand more are coming to read it every day.

Apple customers care about everything Apple. ■

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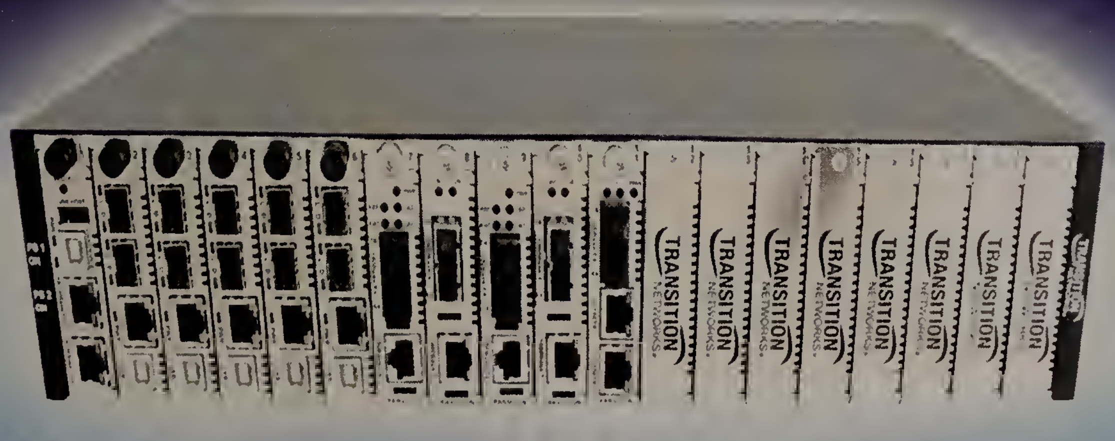

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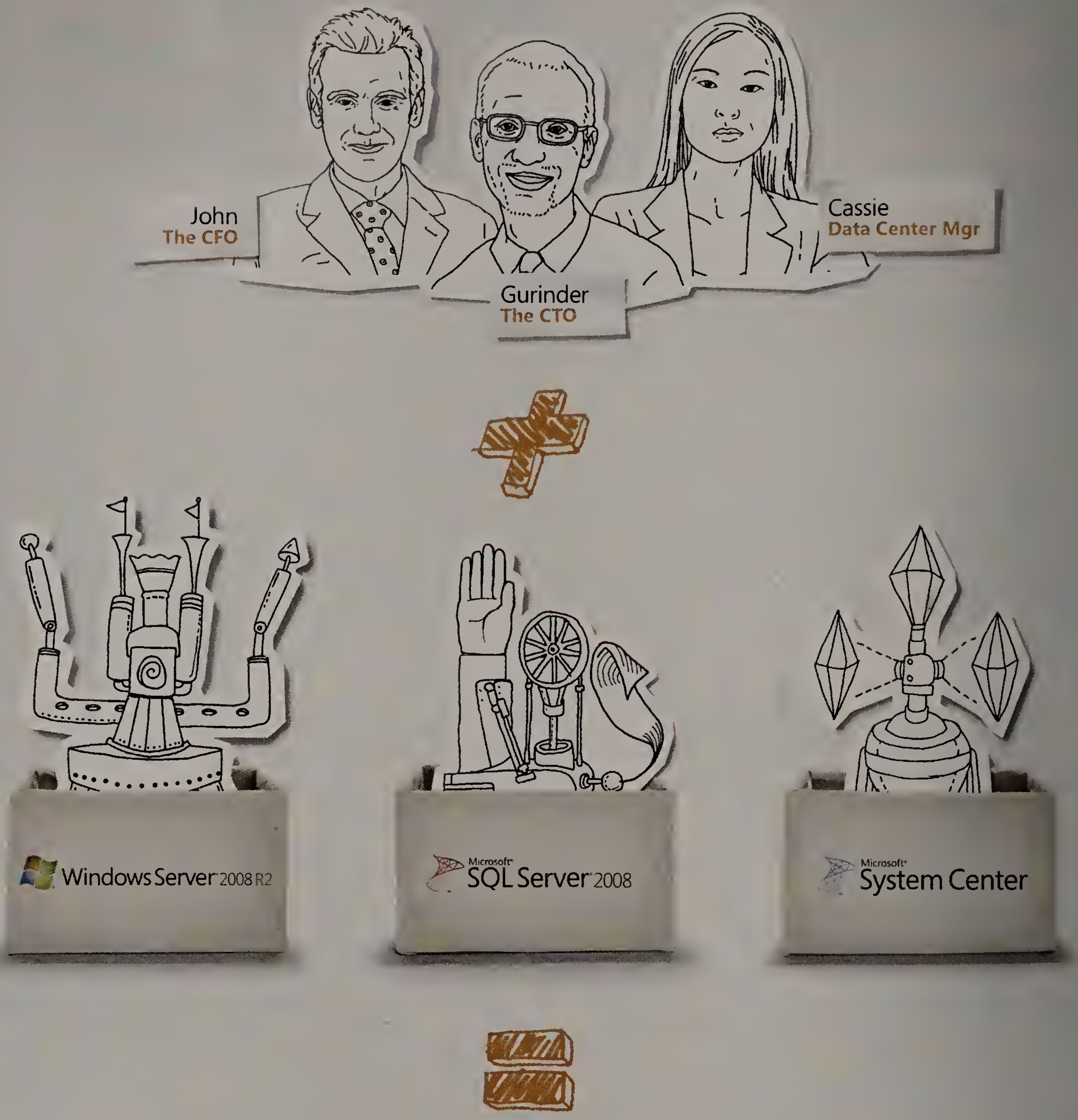

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